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THE TEACHER'S DIARY AS AN INSTRUMENT OF FOLLOW-UP WORK

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A STUDY of current literature indicates that there have been various proposals and suggestions for integrating the pre-service training of a teacher to her in-service functioning after graduation. In general there has been no satisfactory technique for effecting this desired integration. The agencies and instruments used in a program of following up graduates have not been validated. The techniques used in follow-up work generally take the form of rating sheets and questionnaires that are filled out at the end of a teaching period, and the teacher whose work is being considered does not participate in the appraisal.

The purpose of this study is to investigate the possibilities with an agency which would create a situation whereby the beginning teacher could present to the teacher training institution her own point of view regarding her problems. This agency should meet the following requirements:

1. The teacher herself, rather than the supervising official, must render the report to the teacher training institution.
2. The report must be an immediate appraisal and evaluation while the problems and experiences are still fresh, instead of a report at the end of the school year when the teacher has either solved her difficulties or, because of her failure to do so, has possibly become discouraged or been dismissed.
3. Another requirement is that all these pertinent records and reports should have as their goal a finer and closer spirit of coöperation and understanding between principals, training teachers, beginning teachers, and the teacher training institution.

The material presented in this article is the account of an experiment in which the teacher's diary was used in a follow-up program. The diary here referred to was a report written by the beginning teacher at the end of each day and mailed to the follow-up worker at the normal school.

The specific objectives in the study were these:

1. To establish rapport between the teacher in service and the teacher training institution.
2. To assist the beginning teacher in service to effect a happy and efficient adjustment of her general working conditions: to meet, for the most part, ordinary school conditions.
3. To aid the teacher in adjusting herself to the life of the community.
4. To improve the general morale of the beginning teacher in service.
5. To secure reliable and adequate information useful in advising the beginning teacher in service and in matters relative to immediate self-improvement in methods, discipline, etc.
6. To aid in specific problems involving matters of professional ethics.
7. To secure reliable and adequate information useful in advising beginning teachers in service in regard to questions about change of position or resignation.
8. To aid the teacher in matters pertaining to references and teaching materials.
9. To locate and define teaching difficulties under ordinary school conditions.
10. To discover needs of individual school systems and matters of local character significant for the selection and supply of candidates for that locality.
11. To see that special abilities of beginning teachers are recognized by their local supervisory officials.
12. To secure information which will be helpful to the teacher training institutions in the revision of its curriculum.

The number of teachers participating was thirty and the total number of problems presented was 3930. These problems could easily be classified in many and various ways but the classification finally adopted was that which seemed to render greatest assistance in the realization of the objectives as given. The categories for classification were:

Definitions and Illustrations of Categories Used in the Classification of Direct References Found in the Diaries.

1. Pupil Control. Broadly speaking, management; i.e., securing and maintaining coöperative working relationships with the pupils apart from those involved in instruction.
2. Techniques Mentioned. Any reference to a procedure, method or way of functioning in any school duties. This includes references

to the way of teaching any subject and method or way of handling any problem of discipline or control.

3. Subject Matter (any school subject). This category includes any reference to a school subject or instructional activity when specifically mentioned.

4. Relationships Directly Involving the Principal, Teachers, Parents, and Others, Excluding Pupils. This category includes any contacts and associations directly involving any members of school personnel, including the community, apart from classroom instruction itself.

5. Well-Being and Reactions to Work. Any direct reference of the teacher to physical or mental well-being or lack thereof, or any reactions to work.

6. School Set-Up, Materials, Equipment, Organization or Administration. Direct references to equipment, organization or administration of school. This category does not include any organization within the class which the teacher herself may have made a part of her classroom procedure or technique. It includes such items as supplies, materials, equipment and organization determined by the authority or direction of some person other than the teacher.

7. Activities of Follow-Up Work. This category includes any reference to the activities of the follow-up worker in his relationship to the graduates of the normal school. It includes references to letters, telephone calls, observations, visits and conferences.

8. Pre-service Education and Training. Any reference in the diary to the education or training given to the teacher herself or to the group of students at the normal school before the teacher started her work under contract.

9. Items Difficult to Classify. Any direct reference which does not seem to fit readily into the eight categories used in the classification.

The percent of direct reference in the daily reports for each category as written was as follows:

1. Control	21%
2. Techniques	28%
3. Subject Matter	15%
4. Relations	8%
5. Well being	11%
6. Set-up	4%
7. Follow-up	5%
8. Pre-service ed. and training	1%
9. Items Dif. to classify	7%

After completion of the daily reports, the chief administrative officials in schools employing beginning teachers gave a 100 percent affirmative response to the question:

"Do you believe that contact with the normal school after graduation is helpful to the beginning teacher?"

In order to test more completely the value of the daily reports to the beginner, a questionnaire was also presented to all teachers who had participated in the experiment. A 100 percent affirmative response was received to each of the following questions:

1. Do you feel that keeping a diary covering your school experiences is one good way to keep in touch with your normal school?
2. Do you feel that the Normal School can help you to become a more successful teacher by keeping in direct touch with you after you graduate?
3. If you were beginning to teach again, would you be willing to keep a diary?

SUMMARY

The results of this experiment indicate a real progress in integrating the normal school's teacher training program with the institutions employing its graduates. Responses to the questionnaires from participating teachers and local school administrative officials show a fine coöperation between the normal school and the elementary schools after the diary had been used as an integrating agency.

Naturally, we might assume that discipline, pupil control and techniques for teaching would constitute major bases of difficulty. It is, however, of importance to know that from the point of view of the teacher herself, real problems fall to a large degree in the same categories in which supervisors and administrative officials had already assumed there were difficulties. This is of importance and carries some weight in curricular revision at the normal school. But the chief value of the daily report appears to be the timing of the follow-up worker's visits to the schools where beginning teachers were working. The reports presented not only the difficulties confronting the beginner, but also her well-being and reactions to problems.

In this respect the diary helped to accomplish results impossible from a questionnaire or rating sheet filled out by supervisors weeks or months after the incidents had occurred. Undoubtedly there are many service areas where the diary as an instrument of follow-up work would accomplish very little, but in this particular area the results indicates that it was distinctly valuable.

EYE MOVEMENTS IN READING

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THE study of eye movements has become an important technique for investigating the reading process. The first serious consideration of oculomotor behavior during reading was reported by Javal in 1879. Important contributions were made by Erdman and Dodge, Huey and Dearborn around the turn of the century. All of these earlier investigators employed very few subjects. In 1917, employing a method which facilitated the use of numerous subjects, an important series of publications on eye movements began to appear from the University of Chicago laboratory. Then in rapid succession Stanford, Minnesota, and more recently Iowa became centers for studying eye movements in reading. No serious student of the psychology and pedagogy of reading can neglect the contributions of eye movement studies. The purpose of this paper is to give a complete bibliography and to review the major trends in those investigations of eye movements which have a direct bearing upon reading.

Textbook discussions and summaries of parts of the field will be found in references (8, 9, 13, 37, 46, 53, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 83, 88, 111, 116, 138, 141, 142, 143, 150, 156, 157, 169, 175, 178, 180).

METHODS OF OBSERVING AND RECORDING EYE MOVEMENTS

Observing and recording visual fixation, speed of eye movements between two points in the field of regard, and duration of pauses have been employed in analyzing the type of oculomotor behavior used in reading. Incomplete surveys of the techniques employed in these investigations are given by Tinker (151), Gilliland (56), and Vernon (168). Employing an after-image method, Lamansky (94) studied the speed of eye movement between two points in the visual field. A pencil of light was flashed into the eye at regular intervals as it moved through a given arc. From the number of after images of the light, which were produced in a given sweep of the glance, and a knowledge of the number of flashes of light per second, was calculated the speed of the eye sweep. A modification of this method was also used by Erdman and Dodge (38) but was later discarded by Dodge and Cline for a more accurate technique. Recently Cobb and Moss (21) have described a method for determining the length of a brief as possible fixation pause at a point between two other fixations in the visual field. At the middle region spots

of light appeared at regular intervals. The number of light spots seen at this central fixation yielded the duration of the pause. Both of these methods are necessarily highly subjective, are dependent upon the memory span of the subject and also have other important sources of error.

Javal (87), the noted French ophthalmologist, was probably the first to note the type of eye movements employed in reading. He reported in 1878 a mirror method for observing and counting eye movements. A mirror was placed in front and a little to the right of the reader so that the experimenter, looking at the mirror from behind the reader, could observe the eye movements. Somewhat later, Erdmann and Dodge (38) used the mirror method but also made direct observations of eye movements by viewing the eye through a telescope with a cross-sectioned field of regard. They also employed an after-image method for determining the approximate location of the fixations along the line of print. The reader looked at the apex of a small wedge-shaped piece of brightly illuminated red paper until the retina was well fatigued. On reading there was a sharply defined negative after image at the place of each fixation. Ohrwall (119), employed a modified ophthalmometer to make a quantitative study of eye movements during subjectively steady fixation. A dim light, passing through one microscope of the ophthalmometer illuminated the eye. The other microscope, which was fitted with a micrometer scale, was focused upon the eye. A superficial blood-vessel of the conjunctiva or a stria of the iris served as a point of reference. Movements of this point could be measured directly on the scale.

More recently Freeman (46) has devised a headgear for holding a small mirror so that the experimenter can easily observe movements of the reader's eyes. There are other variants of these direct methods. The Miles (108) peep-hole technique of direct observation is simple and effective. The experimenter views the eye through a hole near the center of the copy which is held up in front of the reader. A useful modification of the telescope method of direct observation has been devised by Newhall (114).

Various mechanical arrangements have been constructed for the study of eye movements. Lamare (95), working with Javal in France, discovered that one could count the movements of the eyes by pressing a finger-tip lightly against the upper lid of a closed eye while the other was reading. With this in mind he arranged a device so that each movement of the eye broke an electrical circuit which was passed through a microphone. The sounds thus produced by the interrputions corre-

sponded to the number of eye movements. After also noting this displacement of the cornea during reading, Schackwitz (136) devised a pneumatic arrangement for recording eye movements. A tiny rubber capsule was mounted on a spectacle frame so that the capsule rested on the slightly drooping eyelid at the edge of the cornea. A rubber tube connected the capsule with a small delicately adjusted Marey tambour. Eye movements caused variations in air pressure within the capsule. This in turn produced vibrations in the diaphragm of the tambour and the attached writing lever which recorded the movements on smoked paper. A time line was traced beside the eye movement record. The Marbe flame recorder was also used in connection with the rubber capsule to obtain graphic records of eye movements. Galley (48) has modified the Schackwitz apparatus. By means of a complex relay system of three Marey tambours he was able to increase greatly the amplitude of the recording marker which was an ink pen writing on ordinary roll-paper. Youriévitch (181) has devised an eye movement recorder which also employs changes in air pressure to activate a tracing point on recording paper. Obviously there is danger of confusing lid movements with eye movements in this type of apparatus.

Various attempts have been made to record eye movements by devices attached directly to the eye. Ahrens (2) placed a small ivory cup on the cornea. A bristle pointer, which was connected with the cup so that the eye movements were magnified, traced on a smoked drum. No successful records were obtained but the idea was developed by others. Delabarre (24) attached by adhesion a plaster of Paris cup to the cocained eye. To permit vision there was a hole through the center of the cup. He unsuccessfully tried to record eye movements by photographing the light beam reflected from a small mirror fastened to the cup. He then cast a fine wire loop in the cup and connected this to a recording lever by means of a thread. A rubber band held the apparatus in balance with the lever in contact with a smoked drum. Since it was practically impossible to get a tracing of the rapid movements the records were unsatisfactory. Huey (82), however, did complete successfully a similar recorder of eye movements. An aluminum marker was activated by a tiny lever attached to the cup on the eye. This marker was suspended over a smoked drum so that all horizontal eye movements were recorded. To record time the marker was in circuit with an electric current which was interrupted regularly by a tuning-fork so that a spark, jumping from the end of the marker to the metal drum, punc-

tured the paper and displaced a spot of soot. Ohm's (117, 118) technique was somewhat similar to that of Huey, Marx, and Trendelburg (102) fitted a thin aluminum plate to the cocained cornea. By means of a tiny mirror glued to the plate, and a convex lens, the reflection of the light directed at the subject's eye was focused onto moving bromide paper. Head movements were obtained by another beam of light reflected from a curved piece of metal fastened to the nose. In Struycken's (145) apparatus a minute polished ball mounted on three legs was attached to the cornea by tiny hooks. Light reflected from this ball was photographed. By using a total reflection prism he could obtain vertical and horizantal eye movements simultaneously.

A mirror recorder has been devised by Dodge (34) and used by Travis (163) in reading experiments. A tiny mirror is held gently against one closed eyelid directly opposite the apex of the cornea while the other eye reads. Eye movements modify the adjustment of the mirror. This alters the direction of the reflected beam of light which is photographed. A motion picture technique for the study of eye movements was used by Judd, McAllister, and Steele (92). A small flask of Chinese white attached to the cornea was employed as a point of reference in eye movements, and a bright metal bead on a spectacle frame as a point of reference in head movements. Successive photographs were taken of the face about the eyes. In the improved form, a mechanical drive maintained constant speed of the apparatus. A timing device was attached to the handle of the machine. A continuous record of the eye was made by using two films side by side and covering one as the other was exposed. The path of the eye movements was plotted by outlining the successive positions of the spots of Chinese white. Recently Totten (162) has employed a similar technique to study the eye movements of rabbits.

All these methods of observing and recording eye movements have undesirable features. The after-image methods are highly subjective. In the methods of direct observation accurate counting depends upon the memory span of the experimenter and his ability to detect very small moves of the reader's eyes. All those methods which involve mechanical attachments to the eyes call for very careful technique to prevent harm to the eyes and to insure satisfactory records. They are limited in their use, therefore, to a very small number of subjects. Also they involve an unaccustomed load for the eye muscles in addition to other highly artificial conditions. The Dodge mirror technique requires monocular

reading which is far from normal. Although highly effective, Judd's kinetoscopic method involves so much tedious labor in plotting the records to determine the path of the eye that it has not found general use. According to Dodge and Cline (35) any satisfactory method of recording eye movements must fulfill the following conditions: the eyes must be able to operate under normal conditions of binocular vision; the apparatus must be capable of registering both eyes simultaneously; the unit of measurement must be very small; the registering medium must have neither momentum nor inertia; the eye should work under practically normal conditions; and it should be possible to make records from a large number of eyes without serious inconvenience to the subjects either during or after the experiments. The method developed by Dodge (35) seems to fulfill these requirements. A beam of light was directed into the subject's eye. On striking the eye the light was reflected from the surface of the cornea into the camera. Here a falling photographic plate recorded changes in the direction of the beam of light which occurred with each movement of the reader's eye. Timing was obtained by interrupting the beam of light at regular, brief intervals. The camera also allowed the use of a stationary plate, an arrangement employed by Stratton (144) to study eye movements in viewing different kinds of outlines. The Dodge camera has been modified and improved. Schmidt (137), Gray (58), Judd (89), and Buswell (14) at the University of Chicago have (1) substituted film for the photographic plate, (2) installed two independently moving films so that vertical and horizontal movements of the eyes may be photographed simultaneously, the vertical from one eye and the horizontal from the other, (3) improved timing unit and the light source. At Stanford, Weaver (177) developed a method of splitting the light reflected into the camera into two diverging beams by means of prisms so that one beam fell upon the vertical film and the other upon the horizontal. Thus vertical and horizontal movements could be photographed from a single eye. This and other independently derived modifications have been incorporated in the Minnesota (155), and the Iowa (85) apparatus. At Minnesota the prisms for splitting the light beam may be attached or detached, readily, the timer may interrupt the light before it reaches the reader's eye or after it is reflected from the cornea, and an auxiliary timer marks ½ sec. or 1 sec. intervals along the edge of the film. Auxiliary devices for measuring reaction time of the eye and convergence are also available at Minnesota. The corneal-reflection type of eye-movement camera is also used

at Harvard, Texas, Oberlin, Southern California and Bryn Mawr. Recently an efficient portable camera (4) has been devised for photographing eye movements. It can be readily used in schoolroom, office or laboratory. It should find wide use, especially to study the reading of children. Photographing the corneal reflection has proved to be a very useful and widely employed method of studying eye movements.

READING MOVEMENTS AND THE READING PAUSE

The investigation of visual fixation and types of eye movements by Dodge and others has yielded important information concerning oculomotor performance and perception in reading. According to Dodge (28) the nature of voluntary eye movements is threefold: (1) There are the continuous movements which are comparatively slow and usually must have some fixation point. This type is illustrated by visual pursuit of a moving object. (2) Adjustment movements which are comparatively slow and are illustrated by the eye movements in changing from a far to a near fixation point. (3) Finally there are the sweeping movements, called saccadic because of their nature. The latter are typified by very rapid moves alternating with comparatively long fixations.

The most familiar kind of saccadic movements are those in reading or in movement from one fixation to another in the visual field. In ordinary reading these moves cover a visual angle of about 2 to 4 degrees on the average. In reading formulae, algebra problems, or in proof-reading the angle varies from 1 to 2 degrees (Tinker, 151). Walker (175) found the amplitude of forward moves of good readers to be highly constant. Data on the speed of saccadic moves are summarized by Tinker (152). The results of Dodge and Cline (35) are most reliable. The range is 9.9σ for 1 degree to 9.9σ for 40 degrees. Although these moves are very short in temporal duration and vary directly with the amplitude of the move, they are approximately constant for any single individual when the muscular fatigue of the eyes is the same. Dodge has shown that in long saccadic movements there are three phases: (1) positive acceleration, (2) maintenance of maximum velocity, and (3) negative acceleration until the eye comes to rest. Dodge and Cline (35) discovered, and Miles (7, 105) has presented abundant evidence to show that adductive (toward temple) saccadic movements are shorter in duration than adductive. Dodge (28) characterizes saccadic movements as: (a) reaction to eccentric retinal stimulation, (b) having a velocity which is practically uninfluenced by voluntary effort, and (c) being primarily,

not periods of perception, but rather interruptions of vision. Holt (78), finding no perception during these voluntary movements, concluded that this was due to central visual anaesthesia during the eye movements. Dodge (26), however, denies that this is necessarily true. He showed that perception is possible during saccadic eye movements but points out in another report (29) that we habitually ignore such stimulation in the ordinary life situation, probably because of attentional factors. If we did not ignore them, clear vision in reading would be disturbed. Leiri (99) tends to agree with Dodge. Whatever the cause, there is no doubt that we are unconscious of the fusion of sensations which would necessarily occur with the very rapid saccadic eye movements.

In saccadic movements, the eye executes longer moves easier than very short ones. Landolt (96) concluded from experimentation that the eye cannot move voluntarily over an angle of less than 5 minutes. These short moves were very fatiguing. Huey (82) also found that relatively long moves (about 15 cm.) were very fatiguing. This may have been due, however, to the apparatus load on the eye in his experiment. It is probable that the smallest angle of saccadic moves is usually larger than 5 minutes for Marx and Trendelenburg (102) found that involuntary shiftings which occur during fixation of a point were 4 to 5.5 minutes in amplitude.

Both McAllister (103) and Dodge (31) had noted that there was movement during fixation of a point. Öhrwall (119) attempted to measure these movements. He found that there occurred every second or second and a half a freakish, irregular, and very quick move whose amplitude on the average was .045 to .06 mm. According to Marx and Trendelenburg (102) these moves are reflex, passive and unconscious. Subjectively the point remained fixated.

The fixation pause in reading has been found to involve certain eye movements. Dearborn (23) calls attention to an unsteadiness or shifting of varying amounts within the pause. In addition, Schmidt (137) showed that at the initial points of certain fixations there were rather sharp deviations which he claims implies a movement of both eyes in a direction opposite to that of the preceding interfixation move. He found that movement from one fixation to another along the line involves divergence, and fixation at the end of the move involves convergence. Schmidt also noted sporadic instances of isolated deviations in some fixations, which were probably due to a lack of ocular muscle balance. In the reading of Chinese in the vertical, Miles and Shen (107) found that the

pauses showed a tendency to gliding into continuous curves. In reading this type of material the return sweep of the eye to the beginning of a new line usually showed a sharp loop just preceding the initial pause. In a further study (139) along the same lines Shen states that all indications suggest that "the more complicated mechanism for vertical movements is particularly adaptable for shifts of small angles and of a somewhat gliding nature." Shen also noted that, in reading lines of print which were exactly the same length in both the vertical and the horizontal, the reading of the horizontal recorded a larger deflection in the photographic record. This was found to be due to an actual difference in the distance covered by the cornea during the reading.

According to Vernon (171) subjective impressions of ease or difficulty are closely connected with accuracy and inaccuracy of performance in saccadic eye movements from right to left of the visual field. She found accuracy to be greatest when the deeply rooted motor habits of normal reading were operative.

From a comparison of eye movements during non-activity, reading and recall, after learning, Ewert (43) discovered that the typical eye-movements which reading necessitates perseverate in frequency during recall of material previously read and learned. He suggests that these eye movements accompanying verbal recall are themselves a part of the recall.

As we have seen, a line of print is read during several fixations of the eye along the line from left to right. Backward moves within a line for refixating a word or phrase are called regressions. One type of regression (Tinker, 151) is to correct inaccuracies in the location of the first fixation at the left end of a line after the backsweep from the end of preceding line. Other regressions within the line, Type II, are for reading material to achieve more adequate perception and apprehension. According to Dearborn (23), when the typography is optional (see below), the better readers soon tend to form "short-lived motor habits" in which about the same number of pauses are made per line for that particular material. Generally the first pause in the line is longest, the last somewhat shorter, and those between still shorter. The first pause seems to involve a general survey through the aid of peripheral vision of at least the first part of the line. Dodge (27, 31) has also drawn attention to the very important role played by peripheral vision in reading. Extrafoveal vision, especially to the right of the fixation, yields premonitions of coming words and phrase forms as well as stimulating meaning pre-

monitions. Word forms, indistinctly seen in peripheral vision, begin the perceptual process much in advance of direct fixation. Good peripheral vision decreases the number and duration of fixations thus increasing rate of reading. Vernon (175) cites a case of disturbed vision who was quite unable to read when deprived of peripheral vision to the right of the fixation. Similarly it has been shown by Meumann (104) that indirect vision is an important aid to the proper location of the first fixation on the correct new line after a backsweep. Both Dodge (27, 31) and Gray (60) point out the need of training for the correct use of these marginal impressions in reading.

The first and last fixations in a line are usually indented from the ends of the line. Huey (82) discovered that 78 to 82 percent of the printed line was covered by the fixations. The findings of Dearborn (23) are similar. Tinker (151) found that this varied with the type of reading: 84 percent of the line was transversed by the eye in reading prose, 89 percent in algebra, and 99 percent in lines of formulas. As reading and study becomes more analytical, therefore, more of the line is covered by the fixations. In this same study, Tinker (151) discovered only a rather low positive correlation between extent of the eye movement and duration of the succeeding pause.

The time taken for fixation pauses plus that for eye movements yields the total reading time of any selection. Erdmann and Dodge (38) first noted that most of the total reading time is fixational pause time. Since there is no clear vision during the eye movements, the perception time is pause time. Tinker (152) has discussed previous findings and added new data to this subject. Revision of Erdmann and Dodge's data shows that perception or pause time takes 93.6 and movement time, 6.4 percent of the reading time. Comparable figures from Shen's study of Chinese reading (139) are approximately 94.5 to 96, and 4 to 5.5 percent. Tinker (152) found on the average that 94.1 percent was devoted to pause time and 5.9 percent to moves. With the more analytical reading comparatively more time was devoted to perception. Walker's figures (176) are somewhat different, being 90 and 10 percent.* Unpublished data of the writer agree with the earlier findings rather than with those of Walker.

INDIVIDUAL DIFFERENCES IN EYE MOVEMENT MEASURES

Four measures are ordinarily considered in studying photographic records of eye movement: fixation frequency; regression frequency;

*There is a typographical error in Walker's Table III, p. 103. Citation of Tinker's data for formulas should be 97.2 and 2.8 rather than 90 and 10.

pause duration; and perception time which is merely the sum of the pause durations. Prior to 1917 there was little attention devoted to individual differences in the field of eye movements. Javal (87), Landolt (96), Erdmann and Dodge (38), Huey (82) and Dearborn (23) were interested mainly in an analysis of the reading process. Nevertheless, even their few subjects showed marked individual differences in fixation frequency. In all later studies involving more subjects, perception time, regression frequency and fixation frequency have shown marked individual differences. Pause duration is less variable.

Several experiments have been concerned with the efficiency of eye movements in reading at various age levels in comparison with adult reading. In Schmidt's investigation (137), 21 elementary school pupils from the second to the seventh grade, 17 high school pupils and 45 adults were subjects. Eye movements were photographed for careful oral and silent reading. Typography was uniform for all subjects. The silent reading revealed fewer and shorter pauses than the oral. There appeared to be a higher relationship between fixation frequency and speed of reading than between pause duration and speed. The correlations were higher with the older age groups. There was little difference in pause duration and fixation frequency between the elementary school children and the older groups. This is probably due to the few grade children tested, for both Gray (58) and Buswell (16) did find such differences. Schmidt's grade group did show more regressions than the other groups however. In his opinion the mechanics of silent reading are mastered by second graders. It is likely that the second grade group was selected for Buswell (16) found that mastery of the mechanics of reading usually comes in the fourth grade. In most instances oral reading was slower than silent reading. Some correlation between rate and comprehension was evident for silent but not for oral reading.

A further study of eye movements in silent reading was made by Gray (58). He selected subjects to have some poor, some medium and some good readers. There were 41 grade pupils, 10 high school and 8 college students. Data from the silent reading revealed two types of rapid readers: (1) those who reduced the number of pauses to a minimum; and (2) those who reduced the duration of pauses to a minimum. The first type with a wide span of apprehension was more efficient. In general, however, the rapid readers made shorter as well as fewer pauses. While the upper grades had fewer pauses per line than the lower grades, there was only a small difference in pause duration. It seemed that span

of apprehension changed more rapidly than rate of assimulation with maturation of reading habits. Regressions were a feature of slow as well as of immature readers (lower grades). In general the records showed that oral was less efficient than silent reading.

In an extensive investigation, Buswell (16) determined the stages of growth in the span of recognition, rate of recognition for perceptual units, and regularity of perception along the line of print. These were obtained by ascertaining the number and duration of pauses and the number of regressions per line. He employed 186 subjects extending from the first grade through the university. Selections were read silently and orally. In silent reading fixation frequency decreased rapidly during the first four school years; it remained about constant from the fifth grade through the freshman year of high school; and again decreased during the middle high school period. There was a rapid decrease in pause duration up to the end of the fourth grade and a slower decrease to the end of the sixth. Thereafter there was no decrease with the exception of high school juniors. The results indicate that a pause duration of from 5 to 6 twenty-fifths of a second satisfies the perceptual demands of mature reading, and that this level may be reached by the end of the fourth grade. Both Tinker (151) and Frandsen (45) have pointed out this tendency toward slight variability in pause duration. In Buswell's study the number of regressions was reduced rapidly during the first four grades; no material change occurred through grades V, VI, and VII; but there was another reduction during the early high school period. It would appear that eye movement habits in silent reading have become fairly stable by the end of the fourth grade.

Buswell also found that the trends in eye movement measures in oral reading were similar to those in silent reading but on a less efficient level. Growth in effective habits of eye movement showed considerable correlation with achievement on standard reading tests in both silent and oral reading. Although the number of subjects in each grade is small, his study revealed more consistent group differences than either Schmidt's (137) or Gray's (58) investigation. The results of this investigation, however, should not be accepted as true growth curves in eye movement habits for each grade group after the first is more and more highly selected by the school system. True growth curves can be obtained only by measuring the eye movements of the same subjects on successive years. Eurich (42) has determined fourth and fifth grade norms for eye movement measures. The variabilities presented with the medians enables one to compare in-

dividual cases with these standards. Norms for other grades will be established later.

As part of a larger investigation on silent reading, O'Brien (115) obtained photographic records of eye movements before and after his subjects were given drill in rapid silent reading, and special training to decrease vocalization. He found that the greater speed in silent reading acquired through the special drill was accompanied by a noticeable reduction in the number of fixation pauses and the number of regressive movements. There was a slight tendency for the pause duration to increase. These changes were consistent for slow, medium and fast readers. Pressey (125, 127), keeping intelligence constant experimentally, found that good readers in comparison with poor readers are characterized by fewer fixations and regressive movements per line and greater accuracy of the return sweep to the beginning of the succeeding line.

In studying the eye-voice span of the photographic technique with a dictaphone attachment, Buswell (14, 15) found that the span was generally fully developed by the fifth grade. The poor readers, however, continued to improve slowly through high school. Fast readers had a wider span than slow ones in every grade. Reading rate and eye-voice span increased together. Although little correlation was noted between eye-voice span and position in the line of print, the span was somewhat shorter at the right end than any other place in the line. It was found, however, that width of eye-voice span varied considerably with position in the sentence. It was greatest at the beginning of the sentence, less within, and least at the end. These differences were most prominent for good readers. There was a negative correlation between width of eye-voice span and fixation frequency but no constant relation between the span and regression frequency or pause duration. Development of span of apprehension corresponded well with growth of the eye-voice span.

Employing the peep-hole method, Miles and Segal (109) made a quantitative study of eye movements in the reading of 59 third-grade students. They found a clear differentiation between good and poor readers but their averages are considerably lower than those obtained by the more objective photographic method in other investigations. Davidson (22) found that the eye movements of a superior child, three years and seven months old, to be more efficient than those of ordinary children in the third grade.

Miles and Bell (110) have evaluated the use of the photographic records of eye movements in investigating study habits. On the basis of

results from 16 subjects the authors suggest that by using three or more measures of studying ability, as Thorndike intelligence test scores, amount read in rapid reading practice, and eye-movement records, it is possible to make a practical diagnosis of the studying ability of college students. In comparing the eye-movement records of successful and unsuccessful college students matched for intelligence, sex and major subject, Eurich (41) discovered no marked or statistically significant differences. The successful students revealed slightly shorter pause duration, a slightly greater pause frequency and slightly less regression frequency. There appeared to be a slight tendency for the successful students to read faster and comprehend better than the unsuccessful ones with the same intelligence. Litterer (100), employing college students as subjects, found only a moderate relationship between visual apprehension scores and eye-movement records ($r = .47$ to $.63$). Tinker (158) has pointed out that since perception time and fixation frequency are really measures of reading speed, equivalent results may be obtained by substituting standardized tests for the eye-movement records whenever comparison of reading speed with achievement is desired.

The eye movements of good readers have been studied by Walker (176). The mean pause duration was .255 sec., there were 2.92 ems per fixation (25 ems per line), and .70 regressions per line. Increase in difficulty of the reading material brought an increase in pause duration and a decrease in size of fixation field, but the extent of the forward shift of the eye movements was little affected.

Vernon (173) reaches some important conclusions concerning the influence of the motor ability of the eyes, and of interest and effective reactions on eye movements in reading. Steadiness and accuracy of voluntary fixation and accuracy of voluntary movements appear to be associated with relatively few fixations and regressions in reading. Lack of attention to meaning led to the most rapid reading and most regular eye movements. With difficulty in comprehension and either high personal interest or strong affective reactions to the printed material the reading was slow and eye movements revealed marked irregularities. Since Vernon employed very few and highly selected subjects these interesting and suggestive results should be accepted as tentative.

Critical comment on the use and limitations of eye-movement measures of reading has been made by Tinker (158). He points out that eye movement measures are largely measures of reading speed but that analyses of eye-movement patterns reveal important characteristics of the

reading process. He also advises that care be exercised in maintaining adequate controls and in choosing methods of analysis for examining the data.

EYE MOVEMENTS IN THE READING CLINIC

Eye-movement records have been employed to study individual cases with reading difficulties. Freeman (47) found that the eye movements of an alexia case were so irregular and uncoördinated that it was frequently impossible to tell which positions on the record corresponded to the beginnings or to the ends of the lines. This indicated a lack of orderly progress of the perception along the sentences. After diagnosis and special training the subject's eye movements showed fairly well-organized habits which was correlated with considerable progress in reading ability. Rather extensive use of eye-movement records has been made by Gray (62, 63) as an aid in diagnosing cases requiring remedial training in reading. The records revealed: (1) an unusual number of fixations, indicating a narrow span of apprehension; (2) periods of confusion, showing inadequate mastery of word recognition; (3) numerous regressions, demonstrating a lack of rhythmical eye movement habits and difficulties in recognition or in interpretation; (4) extra long pause durations, denoting a slow rate of recognition; and (5) regressions after the first fixation in practically every line, signifying inaccuracies of the return sweeps from the end of one line to the beginning of the next. The eye movements became more orderly and efficient after remedial training. Similar findings are reported by Hincks (75).

The peep-hole method (108) is recommended by Miles and Segal (109) for clinical observation of eye movements in investigating the reading habits of children. They found the technique adapted to observing fixations, regressions, confusions (detailed examination of a word), head movements and vocalization simultaneously. The reading habits of children in the third grade were studied. Pressey (128) has also developed a test involving the observation of eye movements for diagnostic use. A manual by the same author (126) contains exercises designed to promote more efficient eye movements in reading. Tinker (160), however, has questioned the effectiveness and need of training the eye movements of poor readers.

Murray (112) photographed the eye movements of 18 stutterers and 18 normal individuals while they read silently hard prose, poetry and light prose. The stutterers used more fixations and regressions, a longer perception time, but shorter pauses than the normal readers. The author's

comparison of his results with those of Buswell has no validity since (1) the former used typewritten and the latter printed copy, and (2) the reading material and the length of line in the two studies were different. In his qualitative analysis Murray identifies six eye-movement patterns which were classified according to presence and position of regressions in reading a line of print. A similar classification was made for pause durations. The results of the author's comparison of stutterers and normal readers by means of these classifications may be stated in simpler terms by saying that the stutterers manifested much greater irregularity in sequence of fixations and in pause duration than normal readers. In a later study, Jasper and Murray (86) photographed the eye movements of stutterers during oral reading. Marked irregularities were discovered. While normal readers sometimes revealed slight tremors in adjustment of the eye to fixations in reading, the stutterers frequently showed pronounced tremor. Vertical movements of the eyes was slight for normal readers but was found to be relatively marked with the stutterers. There was some evidence that the dominant eye came to the correct accommodation and adjustment in the fixation pause earlier than the non-dominant eye. The eye movements of the stutterers revealed some evidence of "blocks" similar in nature to those that exist in speech-muscles.

In a comprehensive study of 21 retarded readers in comparison with a control group Robinson (133) has attempted to evaluate the role of eye-movement habits in determining reading ability. Training for comprehension has no effect on the eye-movements. However, the training for rate which included eye-movement "pacing" produced more words read per fixation and fewer regressions. Robinson states that the "pacing" improved eye-movement habits, which in turn increased reading efficiency. This conclusion may be questioned. There is much evidence that eye-movements, for the most part, are merely symptoms rather than causes of reading proficiency.

A critical estimate of the role of eye movements in diagnostic and remedial reading is given by Tinker (158, 160). He points out that, to the uncritical reader there seems to be some evidence that training eye movements improves reading. Inconclusive evidence and arguments or citations for this are presented by Dearborn (23, 101), Fordyce (44), C. T. Gray (59), W. S. Gray (62, 63), Peters (124), Pollock and Pressey (125), Pressey and Pressey (126), Ring and Bentley (132), Truax and Pressey (164), and Robinson (133). There are ample data, however, which indicate that variations in eye movements are controlled mainly

by changes in processes of perception and apprehension. These data are cited by Tinker (158, 160). Other arguments or evidence that eye movements do not cause but merely reflect proficiency in reading are given by Bird (8), Brooks (10), Buswell (17), Judd and Buswell (91), Ruediger (135), Gates (49, 50), Hollingworth (77), Frandsen (45), Orton (121) and Vernon (173, 175). In Gates and Bennett's monograph (52), Gates seems to have reversed his earlier position. He and Bennett now argue unconvincingly that formal training of eye movements is a desirable and effective method of correcting reversal tendencies in reading. The authors make questionable inferences concerning tendencies to reversals. In summing up, Tinker (160) concludes that the measurement of eye movements may be dispensed with in the reading clinic, and that "pacing" eye movements may be omitted without lessening the effectiveness of the remedial instruction.

EYE MOVEMENTS AS A MEASURE OF LEGIBILITY

Javal (87) first pointed out some of the effects of variations in typography upon eye movements in reading. He considers that an important condition of fatigue and strain in reading is the excessive amount of asymmetrical accommodations required in reading long lines in comparison with shorter lines. The fixation point is nearer to one eye than the other, and is constantly changing. This is greater for the longer lines. Javal argues for a line shorter than 90 mm. (19 picas). Huey (82) points out that the shorter lines require less eye work (movement). He found, in fact, that readers could read printed matter in lines of 25 mm. in one downward sweep of the eye without any lateral movements at all. For material printed this way the extent of the eye movements is reduced to about one-fourth that needed in reading an equal amount of material in long lines. In general, more words are read per fixation in the shorter lines. These findings are supported by those of Dearborn (23). He points out that the general survey of the line during the first pause makes more effective use of peripheral vision with the shorter lines. He also found that the shorter lines facilitated a rhythmical regularity of eye movement which contributes to speed and ease of reading. Therefore he argues for lines of uniform length which he claims foster the "short-lived" motor habits of making about so many pauses per line for a given passage while broken lines confuse and prevent such habits. There is, however, some question concerning the validity of such statements concerning "short-lived" oculomotor habits in reading. A comprehensive

study of the influence of regularity of margins and length of lines upon rhythm in eye movements is now under way at the Minnesota laboratory. It is common experience that, with comparatively long lines, the first fixation at the left end frequently needs readjusting. Furthermore, the tendency to lose one's place on the return sweep to the next line always increases as the lines become longer.

Gilliland (57), employing photographic reductions and enlargements of printed material, recorded eye-movements for reading material ranging from 6 to 54 points in size and also from 3 to 90 points. He concluded that "the reading of the average adult is not greatly affected by changes in the size of type between the limits of 36 point and 6 point type." Later investigations employing other techniques indicate that the effect of small and large type upon reading speed is somewhat greater than Gilliland's conclusions imply.

Several investigators have found that black print on a white background is read faster than white print on a black background. Taylor's investigation (147) revealed that this difference in favor of the black print was due to a lesser frequency of pauses. There was no significant difference in pause duration.

EYE MOVEMENTS IN SPECIAL READING SITUATIONS

Many investigators have concerned themselves with special types of reading. In an early study Landolt (96) noted that, in reading series of numerals, the eye movements were so short and fast that he could not count them. There seemed to be one move for almost every number. Frequent regressions occurred. Dearborn's (23) photographic records showed that in reading numbers the attention is concerned with much smaller printed units than in reading words. When the digits were in small groups the fixation frequency was less than when a continuous series of numbers was read. There were as many as 30 shifts of the eye in reading 24 digits. In a more extensive investigation Terry (148, 149) analyzed the eye movements made in reading numerals in arithmetical problems and numbers arranged in lines. He found that the numerals in problems made greater demands on the attention of the reader than the accompanying words both in the number of fixations and regressive moves. Pause duration was also greater on the numerals. At the initial reading, numerals of few digits were usually completely read but longer numerals were only partially read by some subjects. Marked individual variation in pause duration and fixation frequency occurred.

Because Terry's subjects read arithmetical problems and isolated numerals slower than ordinary prose he concluded that they are more difficult types of reading than the prose. The application of this conclusion to the reading of numerals may not be valid since such numerals are symbols and involve a larger amount of abbreviation than words. Numbers are a compact way of printing. Their very compactness probably requires a longer reading time than do words per unit space. With two different methods (photographic records and direct observation of eye movements) Tinker (153) obtained consistent results demonstrating that the compactness of printing achieved by employing numerals rather than words, produces faster reading of arithmetical problems. In a photographic study of the reading of familiar numerals, Rebert (130) found that, in general, that numerals tended to be read in the same manner as words of the context although in several cases detailed readings involving two or more fixations on the numerals occurred, especially with 3.1416. Pauses on numerals were longer than on words of the context.

Eye movements of adults during the addition of digits in columns of varying length and difficulty were found by Buswell (17) to be characterized by: (a) regular progress of the fixations either up or down the column; (b) relatively short and uniform pause duration; (c) usually about one fixation per digit but a tendency at times to read two digits at one fixation; (d) location of the first fixation somewhat within the column and then fairly uniform progress along the column with few regressions. With children, however, the eye movements involved: (a) regressions at the beginning and within the column; (b) marked variability in pause duration; (c) a tendency toward mature habits by good adders, and irregular and often random movements along the column by children with poor arithmetic ability. Pause duration was longer in adding than in ordinary reading. Buswell concludes that eye movements are adapted to mental processes and that complex eye movements and very long fixations denote confused central processes.

Significant variations of eye movements in adjustments to changes in reading attitudes produced by explicit directions or unexpected questions on the first passage read were found by Judd and Buswell (91). Variations also occurred from one type of analytical study to another. These variations seem to indicate that eye movements readily reflect changes in the central processes of apprehension and comprehension.

An analysis of eye movements in reading formulas was made by Tinker (151). Algebraic formulas in context produced a greater fixation

and regression frequency than the reading of scientific narrative. The mature students read chemical formulas about like algebraic formulas. The eye movements of elementary students indicated, however, that they read some formulas and omitted reading others. Eye movements in reading isolated formulas was essentially the same in nature for readers of various amounts of training. This reading was mainly analytical in nature and was characterized by a high fixation and regression frequency, long pause duration and by concentration of fixations about fractions and compound exponents. In a later study Rebert (131) found that formulas in context were read like words with unitary fixations only when the formulas were quite familiar, very simple and merely contributed to an understanding of the text. In general, formulas tended to be read by both experienced and naive subjects in an analytical manner and in detail, especially when the context directed attention to relationships between characters of the formulas. Rebert's conclusion that "familiar chemical formulas tend to be read as units in the same manner as words are read although analytical readings occur" may be somewhat misleading since only the more simple of such formulas, as HCl were read with single fixations.

Erdmann and Dodge (38) had noted that proof-reading required many more fixations and a longer reading time than in reading either familiar or unfamiliar material. In a more comprehensive study, Vernon (174) points out the chief characteristics of eye movements in proof-reading in comparison with normal reading. In ordinary reading, reading time, and frequency and duration of pauses were very similar for her two kinds of readers (normal and proof-readers). The variability of reading performance and number of regressions were considerably less for proof-readers than for the controls. Furthermore, in reading material with misprints (proof-reading) the reading time and number of regressions increased much less and then remained more constant for proof-readers than for the other subjects. Vernon concludes that this was due to the fact that the proof-readers were able to adopt and maintain indefinitely a more efficient attitude or mental set towards each type of reading material than the normal readers.

Eye movements in studying spelling are analogous to those in other kinds of reading according to Abernathy (1). The more mature spellers have a broader recognition span, briefer pauses, and fewer regressions. The eye movements of good spellers tend to be systematic. Although adults tend to survey words as wholes, children exhibit random eye

movements to a considerable degree in studying spelling. In a more comprehensive study Gilbert (55) compared the oculomotor and perceptual habits of good and poor spellers from Grade III through the senior high school. At every grade level the good spellers employed fewer fixations, a shorter study time, briefer and less variable pauses, a broader study unit and fewer regressions than the poor spellers. The study of spelling appears to be characterized to a large extent by forward progressions of fixations across the word, interruption of the progression at times by regressions, than another cross-passage of the fixations, etc., until the word is learned. The younger learners tended to explore each word minutely while the more mature students apprehended parts of the word in larger units and tended to concentrate on hard sections. The ocular behavior of poor spellers is the antithesis of that of efficient spellers. The author fails to emphasize the fact that efficient or inefficient oculomotor performance in learning to spell is merely symptomatic of efficient or inefficient central processes of perception and apprehension. The growth curves of eye-movement measures presented by Gilbert cannot be accepted as valid since there is a strong possibility of sampling errors in the groups of only 3 or 4 subjects used. Also the inefficient student is eliminated from school in the upper grades. True growth curves can be obtained only when the same group of individuals are measured on successive years. Data derived from an analysis of individual records of study procedure furnished important hints for teaching and remedial work.

In reading music, according to Jacobsen (84), pause durations and number of fixations of mature and immature subjects are somewhat similar to those in ordinary reading. Complexities in the music tended to increase both pause duration and fixation frequency. In two clef music there was a general tendency to read chords from above downward. The mature readers of music had fewer and shorter pauses and fewer movements from clef to clef than the immature readers. Weaver's comprehensive study (177) of eye movements in reading music is not yet published in full.

A quantitative and qualitative analysis of eye movements in reading prose and objective examination questions differing in type and by measured amounts of difficulty has been made by Frandsen (45). The rank of increasing perception time was: true-false, completion, multiple-choice, analogy, and wrong-word. For frequency of fixations and of regressions the ranks were approximately the same. Average pause dur-

ation, however, varied little from one type to another. Although there was a fair relationship between the eye-movement measures for the various types of questions, the correlations between prose and the questions were all low. Little relationship was discovered between the five levels of difficulty. However, increase in difficulty increased fixation and regression frequency, and perception time. Characteristic differences in oculomotor patterns occurred with the various types of questions. In contrast to the reading of prose, the objective questions produced an analytical sequence of movements and a striking variety of procedures. In each instance the mode adopted for a particular type appeared adequate. The analysis indicated that the oculomotor processes are subordinated and flexible in their responses to the central processes of apprehension and assimilation.

Oculomotor behavior during typing revealed, according to Butsch (20), a greater fixation frequency and pause duration than in ordinary reading. The eye-hand span was found to vary directly with speed of typing, ranging from zero to 13 letter spaces. Most of the typists tended to keep the eye about 1 to 1½ words ahead of the hand so that there was about one second between seeing a letter and writing it. There was little evidence, even for expert typists, that writing is frequently done by phrases. "Apparently during typewriting the eye does not read at all at its maximum pace or even at the rate which is determined by the requirements of comprehension, but instead reads only rapidly enough to supply the copy to the hand as it is needed."

A number of investigations have been concerned with the reading and study of foreign languages and the reading of Chinese by Chinese. Preliminary studies by Landolt (96) and Erdmann and Dodge (38) demonstrated that reading a foreign language makes a greater demand on the eye than one's own language. The foreign language is read with an appreciably greater number of fixations and sometimes with a greater pause duration also. Judd and Buswell (91) compared eye movements in reading French and Latin with each other and these, in turn with those in English which was the native language. The readers were good third year language students. The records indicated a labored type of reading in the French. There was no indication, however, that any student read Latin. There was an aimless looking at the Latin words with numerous irregular eye movements which indicated an unsuccessful attempt at analysis. In fact, these eye movements took on the character of mere helpless wandering. There was no attempt to correlate complexity of eye

movement with amount of meaning present in reading the French and Latin.

A comprehensive study of eye movements in reading English (vernacular), French, German, Spanish and Latin has been made by Buswell (18). The eye-movement records showed that at the end of two years training, elementary school pupils have not reached the maturity in reading a foreign language attained by high school and college students after a like period of study. The so-called direct method of teaching produces desirable reading habits but the translation methods do not. At the end of two years students exhibit similar oculomotor habits in reading French, Spanish and German but less efficient movements in Latin. It was quite evident that the average student does not achieve mature reading habits by two years study of a foreign language. When Chinese students read Chinese in the horizontal arrangement, Miles and Shen (107) found fewer and briefer pauses than in the reading of English. There were, however, more words read per fixation and per second in reading the Chinese. The compact arrangement of Chinese words partially accounts for this.

When eye movements were recorded while reading Chinese in the vertical and the horizontal axes, Miles and Shen (107) discovered no consistent variation in pause duration. In the vertical arrangement, however, slightly more words were read per fixation and per second. In a more comprehensive investigation, Shen (139) studied eye movements in reading Chinese in both the vertical and horizontal arrangements with size of type and length of line constant. There were fewer fixations and regressions in reading the vertical arrangement. Again, no consistent difference in pause duration appeared between the two printing arrangements. Shen considers that (physiological) factors, other than habit are partially influential in producing the more efficient reading of Chinese in the vertical arrangement. Tu (165) also found fewer fixations in reading Chinese in the vertical lines of printing and concludes that habit is responsible for the difference. Nevertheless, any careful consideration of the relative efficiency of the two printing arrangements must take into account Shen's findings which emphasize the physiological factors involved.

It has been clearly demonstrated that even in ordinary reading, when a difficult or unusual word or passage is encountered, the regularity of the forward sequence of eye movements is interrupted and pause frequency or pause duration, or both, increase. We have seen that in the

special types of reading investigated there is a greater demand on the oculomotor mechanism than in reading ordinary material such as fiction or straight narrative. In the special reading situations a slower reading rate occurs and frequently characteristic eye-movement patterns arise. Two factors seem to be involved in the slowing-up process: (1) an analytical method of procedure which comes from the attention being directed to smaller perceptual units as in reading numbers or formulas, and (2) a retardation of the apprehension and assimilation rate which occurs when the meaning and relationships are grasped with varying degrees of difficulty as in reading a foreign language or a complex formula.

RELIABILITY OF EYE-MOVEMENT MEASURES

Until quite recently the question of reliability of eye-movement measures had not been raised. Investigators had apparently assumed that the various measures of eye movements were sufficiently reliable to justify rather definite conclusions from the data collected. It happens, however, that recently published reliability coefficients for measures of eye movements are relatively high. Correlating first half against second half of the test and applying the S-B formula, Litterer (100) obtained coefficients of .91 and .92 for perception time and fixation frequency on easy prose, and .91 and .78 for the same measures on scientific prose. Adult subjects were used. Eurich (39) also cites reliability coefficients for adult reading. Correlating two short paragraphs read at the same sitting and applying the S-B formula resulted in the coefficients: fixation frequency = .85; pause duration = .91; regression frequency = .77. In a later study with fourth and fifth-grade readers, Eurich (40) obtained the following reliabilities for reading three short paragraphs of material: fixation frequency = .91; pause duration = .86; regression frequency = .91. For any single paragraph the coefficients ranged from .62 to .87. Similarly Frandsen (45) obtained odd-even reliabilities of .88, .87, and .78 for perception time, fixation frequency and regression frequency for adult reading of prose. For the objective questions the coefficients ranged from .65 to .78 for perception time, .66 to .81 for fixation frequency, and .55 to .90 for regression frequency. The coefficients for the objective questions were for reading five questions. Since the questions varied in difficulty the computation of reliabilities offered difficulties.

Tinker (161) has computed test-retest reliabilities of all eye-movement measures for readings done at the same sitting and for readings done at separate sittings. With reading selections of 5 to 16 lines all re-

liabilities were found to be satisfactory for group comparisons in both easy and hard prose. If one is concerned with individual diagnosis, however, averages from reading 25 or more lines should be employed if possible. Results from less than approximately 20 lines probably should never be used for individual diagnosis unless a reliability of .80 or above has been established for the particular selection to be employed. One paragraph was correlated with another (1) when both were read at the same sitting, and (2) when one was read at the first and the other at the second sitting. The ranges of reliability coefficients for reading the single paragraphs of from 5-12 lines of easy prose are:

Perc. time, single sitting, .70 to .86; two sittings, .51 to .83.
Fix. freq., single sitting, .72 to .84; two sittings, .59 to .80.
Pause dur., single sitting, .68 to .89; two sittings, .60 to .77.
Regr. freq., single sitting, .58 to .76; two sittings, .50 to .75.

For hard prose (6-16 lines) the comparable coefficients are:

Perc. time, single sitting, .69 to .82; two sittings, .51 to .83.
Fix. freq., single sitting, .74 to .80; two sittings, .57 to .73.
Pause dur., single sitting, .73 to .84; two sittings, .67 to .83.
Regr. freq., single sitting, .64 to .81; two sittings, .61 to .81.

When 23 lines of easy prose and 39 lines of hard prose were used, the test-retest reliabilities ranged from .72 to .88 with an average of .82. The low coefficient occurred for perception time on hard prose.

In general, the evidence indicates that eye-movement records of reading are reliable measures. Nevertheless, a sufficiently large sample of reading performance to insure adequate reliability should be taken whenever individual diagnosis is planned. The results of all previous studies which have employed less than 20 lines of reading copy can indicate only group trends. Few of these studies have employed this many lines.

VALIDITY OF EYE-MOVEMENT MEASURES

It would seem that, quantitatively, all measures of eye movements in reading are to a certain degree measures of speed of reading. Perception time is merely the sum of the time devoted to pauses, and as we have seen, is approximately 94 percent of the reading time. Since the time devoted to moves is so small it has usually been neglected and perception time taken as a practical measure of reading time. Pause duration, fixation frequency and regression frequency have all been used without discrimination as measures of reading speed or reading efficiency. Frequently the implication has been that these measures mean the same or

nearly the same thing. To check these implications perception time may be employed as a criterion of speed in reading and the other photographic measures compared with it. In a preliminary study, Tinker (154) found a high correlation between fixation frequency and perception time but only a fair relation between either pause duration or regression frequency and perception time. Eurich's results (40) support these findings. In a more comprehensive study, which included records from large groups of subjects and for various types of reading situations, Tinker and Frandsen (159) obtained additional data on this matter. Again it was found consistently, that there was a high correlation between fixation frequency and perception time, a fair correlation between perception time and regression frequency, and a very variable correlation between perception time and pause duration. They conclude that fixation frequency is a good, regression frequency a fair, and pause duration a poor measure of reading speed. Tinker (158) has pointed out, however, that the eye-movement patterns disclosed by the study of fixation and regression sequences in relation to pause duration reveal important characteristics of the reading process.

It has been suggested that the artificial situation involved in photographing eye movements may inhibit normal reading performance. Tinker (161) has attempted to test out the adaptability of subjects to the photographic situation. He found that if the subject is given a brief explanation of what the apparatus does and a practice trial of reading before the camera prior to the experimental trials, the adaptation is sufficient to produce an entirely typical reading performance. It is suggested that this adaptation period should always be included for otherwise some subjects may react emotionally toward the situation, and give an atypical reading performance.

The accuracy of eye-movement records obtained by direct observation have been checked by Tinker (153) and by Robinson and Murphy (134). Their data demonstrate convincingly that although trends are quite adequately revealed by direct observation, about one-fifth of the movements are missed by the experimenter doing the counting. Attempts have been made to validate eye-movement measures by correlating them with achievement on standardized reading tests. Litterer (100), employing speed of reading and comprehension tests, obtained raw correlation coefficients for adults between test scores and eye-movement measures ranging from $-.27$ to $-.51$. Comparable correlations cited by Eurich ranged from $-.02$ to $-.24$ for adults (39) and from $-.11$ to $-.55$ for chil-

dren (40). An investigation by Tinker (161) yielded similar results. It is clear from these results that validity with achievement test scores as criteria is low. In these experiments the material read before the camera has either been entirely different from that in the reading tests or has been read with a different reading attitude. Data in the field of reading indicate that there are many reading skills which are somewhat independent. When the reading attitude changes from one test to another, or when the material in one test is not strictly comparable to that in the other, the highest correlation found between test scores is approximately .60 but the coefficient may be anywhere between .00 and .60. Since coefficients between .25 and .45 are quite representative of these correlations, the validity coefficients cited above may indicate adequate validity for the eye movement measures. At the best, however, this is an unsatisfactory method of determining validity.

Probably the most adequate way of computing validity of eye-movement measures of reading ability is to employ as criteria the scores on material which is strictly comparable to that read before the camera. Tinker (161) found that validity coefficients derived in this manner for fixation frequency, varied between $-.80$ and $-.99$ and for perception time,* between $-.87$ and $-.90$. Pause duration, however, varied between $-.10$ and $-.31$. Unpublished data collected in the same manner by F. S. Beers at the Minnesota laboratory yielded validity coefficients comparable to those just cited. It would seem, therefore, that perception time and fixation frequency are highly valid measures of reading efficiency, but that pause duration is not. The low validity of pause duration is to be expected for we have seen that, in general, this eye-movement measure shows little variability and is not an adequate criterion of reading speed.

A survey of the field of reading reveals several important trends of investigation in the more recent measurement of eye movements: (1) Studies of oculomotor behavior in reading special types of material as in reading foreign languages, formulas, numerals, etc. (2) The use of enough subjects to assure statistical stability of the quantitative data. (3) Analysis of the reading process by studying the characteristics of oculomotor patterns which vary with changes in reading material and reading attitude. (4) Concern over the reliability and validity of the measures used. (5) An increased cooperation between research workers and practical educators.

*The negative coefficient indicates that the reading score increased as the fixation frequency decreased, etc.

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SUPPLEMENT

In a recent report Futch (186) compares the various measures of eye movements in reading Latin and English by beginning and advanced students. Both groups showed less efficiency in reading Latin than in read-

ing English but the difference was greatest for the beginners. Although there was an improvement in reading Latin, the advanced students were still on a word-recognition level. Comparison of teaching methods revealed that emphasis on grammar and translation without abundant reading of easy material hindered the development of efficient oculomotor behavior. In a further analysis of her data Futch (185) found high reliabilities for the eye-movement measures.

On comparing the eye movements of individuals having normal binocular balance with those having exophoria (muscular imbalance), Clark (184) found no differences in either fixation frequency, regression frequency, pause duration, or time required for complete divergence movements at the beginning of the lines of print. The lack of a difference may be partly due to the fact that Clark matched his groups on the basis of reading scores. Eye movements are, of course, measures of reading ability.

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STATISTICAL METHODS IN RECENT EDUCATIONAL LITERATURE*

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WITHIN recent years the application of scientific research techniques to educational problems has increased greatly. Since all research involves the collection, observation, evaluation and interpretation of data, statistical methods have necessarily become an important part of modern studies in education. As a consequence, whether or not they are actively engaged in educational research, present-day teachers and students of education are confronted with an increasing amount of professional literature, much of which is statistical in nature.

It seems logical to assume that a survey of the amount and kind of statistical methods appearing in current educational journals, might give a fair estimate of the statistical knowledge required for adequate comprehension of professional reading. The idea is not original with the writer. That such studies do serve as rough indices of the minimum essentials in a particular field is shown by the results of two previous investigations in the field of education.

The present study was suggested by a previous investigation by H. A. Edgerton[1] of the statistical methods used in five widely read educational journals during a four-year period extending from January, 1921, through December, 1924. The purpose of the study was to determine the minimum essentials of statistical methods necessary for understanding reading of educational literature.

The frequency of appearance of the various statistical procedures found in educational journals was taken as a criterion of the importance of the concept, and the need for knowledge of its use and proper interpretation.

A somewhat similar and more recent investigation was made by Gilchrist,[2] to determine the educational terms which secondary teachers

*This study was suggested and carried out under the direction of Dr. J. Harold Williams, Professor of Education at the University of California at Los Angeles. The writer is greatly indebted to Dr. Williams for much helpful advice and encouragement throughout the study.

[1]Edgerton, H. A. "What Acquaintance with Statistics Is Necessary?" *Educational Research Bulletin*, V (January 6, 1926), pp. 14-16.

[2]Gilchrist, Robert S. "Leading Terms in Educational Literature," *School Review*, XXXVIII (October, 1930), pp. 622-826.

must know in order to understand present-day educational literature. Gilchrist found that ten of the fifteen educational terms having a frequency of occurrence of more than fifty in 1926 and 1927, were terms used in educational measurement, and that six of the ten were specific statistical terms.

From these two studies it appears: (1) That the number of technical terms used in educational literature is increasing, (2) that the terms used are not the same over a period of years, (3) that many of the terms most frequently used are statistical terms, and (4) that such studies do reveal in a rough way the minimum essentials of the technical vocabulary used in educational writing.

The purpose of the present study is to report the findings of a similar analysis of the 1932 issues of the same five journals used by Edgerton, and to determine if possible the present trend in the use of statistical methods in educational literature.

The journals used in Edgerton's and the present study were as follows:

Journals	*Edgerton*	*1932 Study*
Journal of Educational Research	Vols. 4, 7, 8, 10	Vols. 25, 26
School and Society	Vols. 14, 16, 18, 20	Vols. 35, 36
Educational Administration and Supervision	Vols. 6, 8, 9, 10	Vol. 18
School Review	Vols. 29, 30, 31, 33	Vol. 40
Elementary School Journal	Vols. 21, 22, 23	Vols. 32, 33

These volumes included the issues from January, 1921, to December, 1924, inclusive, in Edgerton's study, and from January to December, inclusive, of 1932 in this investigation. The practice of binding certain of the journals in two volumes, each including half of the issues for the year, accounts for the fact that more than one volume was used in the present study. Only half of the yearly issues were used in Edgerton's survey where the journals for one year were bound in two volumes.

In the 1932 study all of the main articles were covered in all journals with the exception of *School and Society*. The only material not included was that under the heading of book reviews, news notes, editorial comment and discussion. In the case of *School and Society*, only the statistical methods used in the section entitled "Educational Research and Statistics" were tabulated.

In order to make the study comparable with that of Edgerton, the same procedure was used in obtaining and tabulating the data. This

consisted of scanning the articles in each journal and preparing a separate list of the different statistical terms and procedures occurring in each article. Each term was thus tabulated according to the number of different articles in which it appeared rather than by its total frequency of mention within a single article. In this way the importance of an unusual procedure was not exaggerated due to frequent mention within one article.

A list of all of the different terms which were found was prepared, and the frequency of appearance was tabulated for each journal separately according to the number of different articles using the term. Due to the length of the list of terms found in the various journals it was necessary to group the terms under several main headings in order to facilitate the tabulation. For this reason the data reported in this investigation are arranged as nearly as possible in order of frequency of the number of articles using each term, within each classification, rather than in rank order of frequency. The number of tables, charts and graphs in each journal were tabulated separately.

The use of statistical methods as found in each of the five journals is summarized in Table I.

TABLE I

SUMMARY OF USE OF STATISTICAL METHODS FOUND IN FIVE EDUCATIONAL JOURNALS FOR THE YEAR 1932

Journals	Total Number of Articles	Statistical Articles		Non-Statistical Articles		Number of Tables	Number of Graphs
		Number	Percent	Number	Percent		
Journal of Educational Research	54	49	91	5	9	152	15
School Review	58	49	84	9	16	156	13
Elementary School Journal	60	40	67	20	33	74	7
Educational Administration and Supervision	78	38	49	40	51	72	2
School and Society	160*	53	33	107	67	140	14
Total	410	229	56	181	44	594	51

*Approximate number of articles in *School and Society* comparable to the main articles in the other four journals.

The most outstanding fact revealed in Table I is that more than one half of the total number of articles included in the four journals use statistical terms and procedures. As might be expected from the character of the different journals the percentage of statistical articles varies greatly among them. Table I also shows how the various journals com-

pare as to the number of statistical tables and charts included in each journal. The number of tables per article ranged from none to twenty-nine, with an average of more than two tables for those articles containing statistical methods. The largest number of graphs in a single article was six.

The specific nature of the statistics used in the five journals is shown in Table II. This table gives a list of the different statistical terms and procedures, and the frequency of occurrence as indicated by the number of articles using each term. A total of 105 different terms was found for

TABLE II

COMPARISON OF STATISTICAL TERMS USED IN FIVE EDUCATIONAL JOURNALS IN 1921-1924 AND IN 1932

STATISTICAL METHOD	Total No. of Articles 1921–1932	1924
CENTRAL TENDENCY		
Average		108
Median	139	65
Mean	130	60
Mode and Modal	3	2
Mid-point		2
VARIABILITY		
Range	34	74
Standard deviation	21	42
Quartile deviation	27	35
Interquartile range	10	3
Median deviation	1	2
Average deviation	13	2
Sigma average		2
Sigma difference		2
Coefficient of variability	1	1
RELIABILITY		
P. E. of r	32	30
P. E. of Difference	1	13
P. E. of Mean	2	8
P. E. of Measurement		5
P. E. of Sigma	1	2
P. E. of a Score	1	1
S. E. of Difference		13
S. E. of Estimate	1	6
S. E. of Mean	1	3
S. E. of Distribution		2
Ratio of Diff. to S. D. of Diff.	1	6
Ratio of Diff. to P. E. of Diff.		4
Ratio of P. E. of Meas. to Mean		2
Ratio of P. E. of Meas. to S. D.		2
QUOTIENTS AND INDICES		
I. Q.	62	42
C. A.		22
M. A.		16
Achievement Q. and Ratios	13	12
Educational and Subject Age		9
Grade Placement		6
Grade and Honor point ratio		4
Error Quotients		2
Index of brightness	1	1

STATISTICAL METHOD	Total No. of Articles 1921–1932	1924
CORRELATION		
Pearson Product-Moment r	107	53
Reliability (general)	10	42
Validity (general)	10	38
Coefficient of reliability		21
Spearman Brown Formula	4	12
Spearman Rank Diff. Corr.	2	9
Coefficient of Validity		8
Zero order coef. of corr.		8
Bi-serial r		2
Multiple correlation	3	8
Partial correlation	2	11
Regression	8	6
Multiple regression	3	3
Partial regression	1	1
Curvilinear regression		2
Coeff. of alienation		5
Coeff. of attenuation	3	3
Coeff. of contingency		2
OTHER TERMS		
Percentage	281	180
Rank and ranking	25	45
Criteria and criterion		31
Norms and standards		32
Percentiles and percentile rank	17	23
Sampling		20
Normal curve	3	13
Skewed and skewness		10
Mental Growth and Learning curves		9
Decile and decile rank		7
Raw score		12
Composite score		5
Weighted scores		5
Predicted scores		3
Derived and transformed values		2
Standard score	1	2
T-score and T-scale	4	2
Isochronic equation		2
Tetrad formula		2
Lindquist's formula for Diff. between matched groups		2
Constant errors		2
Chance errors		2
GRAPHS AND CHARTS		
Graph reading	74	51

the year 1932 as compared with 49 terms found by Edgerton for the period 1921 to 1924.

In addition to the terms listed in Table II, 27 statistical measures and concepts appeared only once in all five journals during the year 1932 and not at all in the previous investigation. For this reason they were not included in Table II. These terms were: midscore, sigma zeta, degree of dispersion, P. E. of rho, P. E. of a tetrad, P. E. of chi square, S. E. of formula, S. E. of r, S. E. of sigma, ratio of S. E. of estimate to S. D. of distribution, 1st-order coefficient of correlation, 2nd-order coefficient of correlation, B-regression, rectilinear regression, students ability index, classification index, grade mark, mental grade age, age-grade ratio, age-grade distribution, point score, cumulative score, Shepard's correction for grouping, McCall E. C. formula for matched groups, chi square test, value of P for chi square, zeta.

The first column in Table II indicates which of the terms found in the present investigation were previously noted by Edgerton. The numbers in this column represent the total number of articles in which each term appeared in his study, and offers a rough comparison with the present data.

Since Edgerton's survey covered a period of four years, and the present one was confined to the one year, his figures bear a four to one ratio to those in the adjoining column. Strictly speaking, the ratio is two to one in the case of the *Journal of Educational Research* and *School and Society*, since Edgerton included only one half of the material within the four-year period for these journals.

Only eight terms were found by Edgerton which were not encountered by the present writer. These were: R (Spearman Foot-Rule), eta, probable error of eta, probable error of distribution, B-score, ogive, standard deviation of multiple correlation coefficient, and correlation index. The present survey includes 56 terms not reported by Edgerton.

Thus it is evident that not only has published reference to statistical methods increased in recent years, but likewise the variety and complexity of statistical procedures which are mentioned. This is particularly marked with reference to measures of reliability and correlation. Apparently the increasing reference to reliability indicates a greater emphasis upon the statistical reliability of measures in general, and the importance of statistical significance of differences between measures, in particular. The relatively frequent mention of multiple and partial correlation, and regression equations and coefficients is further evidence of

the necessity for more technical knowledge of statistics on the part of readers of educational literature.

It is perhaps worthy of comment to note that the technical nature as well as the number of statistical procedures differed considerably among the various journals. A greater number of different terms and more advanced statistics were included in certain journals than in others. This may be attributed in part to the fact that each of the five journals is devoted almost exclusively to a special division of the educational field. However, the findings may indicate that the kind of statistics included in each journal has been a matter of editorial consideration with respect to the statistical knowledge possessed by their readers.

The total number of different statistical terms appearing in each of the five journals is shown in Table III. In addition, Table III shows the range of different terms found within a single article for each journal, and the median number of different terms for articles containing statistical concepts.

TABLE III

TOTAL NUMBER, RANGE AND MEDIAN NUMBER OF DIFFERENT STATISTICAL TERMS USED IN FIVE EDUCATIONAL JOURNALS DURING THE YEAR 1932

Journal	Total Number of Different Terms	Range of Different Terms in One Article	Median Number of Terms Per Article
Journal of Educational Research	89	1–25	8
School and Society	57	1–19	6
School Review	50	2–18	5
Educational Administration and Supervision	45	1–16	4
Elementary School Journal	34	1–15	5

Briefly summarized, the findings of this study suggest the following conclusions:

1. The extent to which statistical methods are used in educational literature appears to have increased to more than twice that of eight years ago, as indicated by a comparison of five periodicals published during the year 1932 and the same journals for the period 1921 to 1924.

2. The nature of the statistics used at the present time appears to be more technical and advanced than in previous years. Thus, more knowledge regarding statistical methods is necessary for the comprehension of current literature in the field of education. This conclusion is in agreement with the contention of other investigators that technical terms in education do not remain the same over a period of years. It also appears

to provide further evidence of a rapidly growing technical vocabulary in this field.

3. The results of this study indicate in a general way the minimum essentials of statistics as used in educational writings. They suggest the advisability of requiring some experience with statistical methods and general measurement procedures in the preparation of teachers, in order that they may have a clearer understanding of present-day educational literature.

COMPARATIVE HIGH SCHOOL ACHIEVEMENT OF PUPILS FROM VILLAGE ELEMENTARY SCHOOLS AND RURAL ELEMENTARY SCHOOLS

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IT was Carlyle who said, "The barrenest of all mortals is the sentimentalist." The present study presumes to apply the method of science to Carlyle's dictum as it pertains to the little red schoolhouse. Is there a difference in high school achievement between pupils who receive their elementary education in village schools and those who receive their elementary training in rural schools? An answer to this question should have significant practical value in terms of the present tendency to enlarge the school unit.

The present study involves 193 village and 196 rural pupils in and near three typical villages in New York State: Clifton Springs, Phelps, Moira. Clifton Springs has a village population of 1725 and a school population of 350; Phelps has a village population of 1400 and a school population of 365; Moira has a village population of 800 and a school population of 200. Schools in the three villages are organized under the 8-4 plan. The

TABLE I

COMPARATIVE ACHIEVEMENT IN ENGLISH OF VILLAGE AND RURAL PUPILS

Subject	Sex	N	M	DM	SD	SDM	SDD	$\frac{DM}{SDD}$
Village Pupils								
English III	Boys	62	73.16	1.40				
	Girls	63	78.11	4.46				
	Total	125	74.86	1.83	8.22	.735	1.036	1.76
English IV	Boys	44	72.78	2.06				
	Girls	55	77.50	4.05				
	Total	99	75.30	2.77	8.55	.859	1.26	2.19
English Grammar	Boys	58	75.22	5.10				
	Girls	59	79.17	1.68				
	Total	117	77.21	1.56	9.22	.852	1.308	1.19
Rural Pupils								
English III	Boys	29	71.76	−1.40				
	Girls	60	73.65	−4.46				
	Total	89	73.03	−1.83	6.89	.731	−1.036	−1.76
English IV	Boys	25	70.72	−2.06				
	Girls	49	73.45	−4.05				
	Total	74	72.53	−2.77	7.97	.927	−1.26	−2.19
English Grammar	Boys	17	70.12	−5.10				
	Girls	51	77.49	−1.68				
	Total	68	75.65	−1.56	8.19	.993	−1.308	−1.19

study covered the period 1910-31 inclusive. The following five subject fields were considered: English, foreign language, mathematics, science, and history. The English group included English III, IV, and English grammar; foreign language involved Latin II, III, and French II; in the mathematics group elementary algebra, intermediate algebra, and plane geometry were used. In the science group, biology, physical geography, and physics were considered. In the history group were ancient history, mediaeval and modern history, American history. A total of fifteen subjects involving the heart of the academic field, was used in the study. The criteria of achievement were the New York State Regents Examinations.

Table I shows that the means for the village group are higher than for the rural group in each of the three subjects: English III, English IV, English grammar. When the test of significance is applied, that is the difference between the means divided by the standard deviation of the difference, it is clear that no difference is of particular significance except in the case of English IV, and this difference is slight. It will be observed that the standard deviation is less for the rural group than for the village group. This is due no doubt in part to the larger number of pupils in the village group. It is interesting that girls excel boys in all three subjects. The village pupils have a higher mean in English IV than in English III, but the reverse is true in the case of the rural group.

TABLE II

COMPARATIVE ACHIEVEMENT IN FOREIGN LANGUAGE OF VILLAGE AND RURAL PUPILS

Subject	Sex	N	M	DM	SD	SDM	SDD	DM/SDD
Village Pupils								
Latin II	Boys	41	73.95	4.29				
	Girls	59	71.22	1.13				
	Total	100	72.34	2.38	9.13	.913	1.29	1.8
Latin III	Boys	12	77.33	1.83				
	Girls	32	71.75	2.13				
	Total	44	73.27	2.71	9.11	1.374	1.81	1.4
French II	Boys	24	70.38	−1.23				
	Girls	43	71.25	−1.12				
	Total	67	70.94	−1.22	7.35	.897	−1.51	−.8
Rural Pupils								
Latin II	Boys	24	69.66	−4.89				
	Girls	52	70.09	−1.13				
	Total	76	69.96	−2.38	7.99	.916	−1.29	−1.8
Latin III	Boys	4	75.50	−1.83				
	Girls	21	69.62	−2.13				
	Total	25	70.56	−2.71	6.43	1.286	−1.81	−1.4
French II	Boys	13	71.61	1.23				
	Girls	32	72.37	1.12				
	Total	45	72.16	1.22	8.19	1.221	1.51	.8

Table II shows that the means of both village and rural groups in all three subjects are comparatively low. State Regents reports indicate that foreign language is usually considered difficult. Village pupils excel slightly the rural pupils in Latin II and Latin III, while the rural pupils excel in French II. The test of significance shows, however, that these differences do not represent significant differences.

TABLE III

COMPARATIVE ACHIEVEMENT IN MATHEMATICS OF VILLAGE AND RURAL PUPILS

Subject	Sex	N	M	DM	SD	SDM	SDD	$\frac{DM}{SDD}$
Village Pupils								
Elementary Algebra	Boys	71	76.77	1.12				
	Girls	81	80.05	1.69				
	Total	152	78.51	1.25	12.32	.999	1.36	.919
Intermediate Algebra	Boys	22	82.95	1.11				
	Girls	24	77.00	−7.35				
	Total	46	79.84	−3.30	11.39	1.680	−2.16	−1.53
Plane Geometry	Boys	44	78.89	3.93				
	Girls	48	74.89	−1.87				
	Total	92	76.80	.73	12.17	1.268	1.83	.39
Rural Pupils								
Elementary Algebra	Boys	57	75.65	−1.12				
	Girls	84	78.36	−1.69				
	Total	141	77.26	−1.25	11.09	.934	−1.36	− .919
Intermediate Algebra	Boys	13	81.84	−1.11				
	Girls	14	84.35	7.35				
	Total	27	83.14	3.30	7.05	1.356	2.16	1.53
Plane Geometry	Boys	28	74.96	−3.93				
	Girls	45	76.76	1.87				
	Total	73	76.07	− .73	11.22	1.314	−1.83	− .39

Table III shows that the means in mathematics are considerably higher than in English or language. The values determined for significance are low, none of them revealing a significant difference. The higher value for significance was 1.53 in favor of the rural pupils in intermediate algebra. Village pupils maintain a slight but not significant advantage in elementary algebra and plane geometry. It is interesting that the differences between the means vary considerably from a 7.35 advantage for rural girls in intermediate algebra to a .73 advantage for the village group in plane geometry.

Table IV indicates that the means for science are relatively low. The values of significance are very small, none of them indicating a significant difference. The largest single difference is in favor of the rural girls

TABLE IV

COMPARATIVE ACHIEVEMENT IN SCIENCE OF VILLAGE AND RURAL PUPILS

Village Pupils

Subject	Sex	N	M	DM	SD	SDM	SDD	DM/SDD
Biology	Boys	85	72.49	.10				
	Girls	90	72.84	− .34				
	Total	175	72.67	− .16	10.08	.762	−1.69	− .095
Physical Geography	Boys	28	70.04	1.17				
	Girls	22	72.36	2.43				
	Total	50	71.06	1.37	8.70	1.231	1.72	.79
Physics	Boys	44	76.16	.42				
	Girls	27	71.77	−2.87				
	Total	71	74.49	− .66	9.33	1.107	−1.82	− .36

Rural Pupils

Biology	Boys	68	72.39	− .10				
	Girls	85	73.18	.34				
	Total	153	72.83	.16	9.62	.777	1.69	.095
Physical Geography	Boys	8	68.87	−1.17				
	Girls	27	69.93	−2.43				
	Total	35	69.69	−1.37	7.16	1.209	−1.72	− .79
Physics	Boys	19	75.74	− .42				
	Girls	22	74.64	2.87				
	Total	41	75.15	.66	9.21	1.439	1.82	.36

in physics. Perhaps from everyday life the rural girl has learned more than the village girl concerning the principles of the pulley, pump, cream separator, gas engine, and similar machines.

TABLE V

COMPARATIVE ACHIEVEMENT IN HISTORY OF VILLAGE AND RURAL PUPILS

Village Pupils

Subject	Sex	N	M	DM	SD	SDM	SDD	DM/SDD
History A	Boys	59	74.42	.97				
	Girls	53	75.26	2.43				
	Total	112	74.38	1.34	9.01	.851	1.17	1.15
History B	Boys	31	71.06	−1.87				
	Girls	31	74.41	3.35				
	Total	62	72.74	1.01	7.62	.968	1.43	.706
History C	Boys	45	73.53	−1.28				
	Girls	52	78.44	6.42				
	Total	97	76.17	3.14	8.34	.846	1.17	2.68

Rural Pupils

History A	Boys	33	73.45	− .97				
	Girls	63	72.83	−2.43				
	Total	96	73.04	−1.34	7.93	.809	−1.17	−1.15
History B	Boys	16	72.93	1.87				
	Girls	29	71.06	−3.35				
	Total	45	71.73	−1.01	7.07	1.054	−1.43	− .706
History C	Boys	26	74.81	1.28				
	Girls	46	72.02	−6.42				
	Total	72	73.03	−3.14	6.86	.808	−1.17	−2.68

Table V shows that the means in history are reasonably high. There is a significant difference favoring the village pupils in the case of American history, but the significance is slight. In the case of ancient history and modern European history, the differences are too low to be significant. The highest mean was made by the village girls in American history. The lowest mean was made jointly by the village boys and the rural girls in modern European history. The means show that modern European history was the most difficult of the three histories.

Summary

1. There is little difference in academic high school achievement of pupils who receive their elementary training in village schools and those who receive their elementary training in rural schools.

2. Only two significant differences exist between the means of the two groups; these differences are in favor of the village group in English IV and American history. The test of significance in these two cases reveals only a small margin of difference.

3. Although differences between means were in general not significant, infrequent means for the village group were higher than for the rural group in all cases except: French II, intermediate algebra, biology, and physics.

4. In general, the means of the girls are higher than those of the boys. Village girls excelled the village boys in: English III, IV, grammar; French II; elementary algebra; biology, physical geography. Rural girls excelled rural boys in: English III, grammar; Latin II, French II; elementary algebra, intermediate algebra, plane geometry; biology, physical geography.

5. The means for village boys excelled rural boys, except in: French II; modern European history, American history.

6. The means for village girls excelled rural girls, except in: French II; intermediate algebra, plane geometry; biology, physics.

7. The greatest single difference between means was in favor of the rural girls in intermediate algebra.

8. In general, standard deviations were larger for the village group than for the rural group.

A NEW METHOD OF WEIGHTING SCORES IN A TRUE-FALSE TEST

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THE experiment herein reported involved the giving of a mid-quarter examination in a course in Extra-Curricular Activities to a class of 62 graduate and undergraduate students at the University of Minnesota during the summer session of 1935. The test was composed of 75 true-false items and was so constructed as to call for the weighting of his responses by the examinee himself according to the degree of assurance with which he made those responses. Thus the examination was calculated to test not only knowledge as such but also the certainty with which that knowledge was held.

The instructions to the student were as follows:

"Mark a statement + if you judge it to be true and O if false. You may claim credit up to 4 points for each of your responses if you wish. Before your responses encircle 4, 3, or 2, depending on the credit you want. If your answer is wrong, the penalty will be *double* the amount of credit you claim. (It is advisable to claim 4 credits if you are sure your answer is correct.)

"If you claim no special credit as described above, you should, nevertheless, answer all questions, even if you have to guess. All such answers will be scored in the ordinary way, right-minus-wrong."

Item No. 52 of the test is quoted below to illustrate how each of the 75 questions appeared in the test:

"52. 4 – 3 – 2 —— Investigations of actual practice indicate that school administrators and teachers have had little to say relative to the content of assembly programs."

Because the penalty for a wrong answer was double the credit claimed, the examinee was actually in a position of having to offer odds of 2 to 1 that his answers were correct. It was thought that such large odds would be a better test of the degree of conviction with which the examinee made his responses than the ordinary true-false test situation, and would discourage more guessing than is done by the latter.

As the instructions further indicate every question was to be answered, even if no special credit was claimed. This was required in order to permit a comparison of scores obtained in the ordinary way (right-minus-wrong) with the weighting method. Thus the test was first scored by

using the standard R-W formula (Method A) and then again by totaling the credits claimed for correct answers minus twice the credits claimed for wrong answers (Method B.) In the latter process no credit was given when no credit was claimed, even though an answer was correct.

The range of scores obtained by Method A was from 8 to 67, with an average of 44.55 and an S D of 10.87. In the case of Method B the range was from −12 to +230, the average 115.25, and the S D 54.80. The Pearson correlation between scores obtained with Method A and Method B was .90. It should be understood that this is a correlation between the results of two methods of scoring the same test, not between the same test given at different times. In the latter case the correlation could not be expected to be so high.

The comparative reliability of the two sets of scores is indicated by an r of .72 ± .04 for Method A and .85 ± .02 for Method B. (These coefficients were obtained in each case with the use of the Spearman formula applied to the correlation between random halves of the scores.) While the difference (.13) between the two correlations is only 2.74 times its probable error, the ratio is certainly large enough to indicate a degree of statistical significance warranting further experimentation with this type of test under various conditions of weighting and penalty for wrong responses. The higher reliability coefficient for the experimental method was obtained in spite of the fact that the number of test items involved in the scoring was considerably reduced by eliminating all correct responses for which no special credit was claimed. The reduction in number of questions is indicated by an average of 57.75 attempted answers per paper under the conditions of Method B compared with an average of 74.3 answers per paper under Method A.

The superior reliability shown by the weighted scores suggests that weighting for assurance in the true-false test has the same effect as lengthening such a test. That there is a relationship between extent of knowledge (as indicated by number of correct responses) and degree of assurance with which responses are made appears in the fact that the average special credit claimed for each correct answer by the 16 (out of 62) students who made the largest number of correct responses is 3.39 points, compared with 2.58 points for the 16 who answered correctly the least number of times.

Question arises concerning the comparative amount of guessing under the two conditions of testing tried out. While the experiment furnished no quantitative measure of the extent of reduction of guessing under the

conditions of Method B, it has already been shown that the average student ventured to attempt answers to only 57.75 of the 75 questions in the test in face of the penalty-for-error conditions set up. While this average cannot be compared with the average number of answers (74.3) attempted under conditions of Method A (because here guessing was encouraged) the writer's previous experience with true-false tests administered under ordinary conditions causes him to believe that the ratio represented by 57.75 attempted answers to 75 questions is considerably smaller than the corresponding ratio in the ordinary test (unless guessing is advised by the examiner). Further support for the writer's opinion that there is less guessing under conditions of Method B is lent by the fact that in a previous experiment with a similar test given to 46 students, the latter, when asked under which test situation they did the less guessing, indicated almost unanimously the experimental method.

CONCLUSIONS

1. The experiment with a true-false test herewith reported indicated that weighting responses in the test by the examinee himself according to the degree of assurance with which he made his responses under the penalty-for-error conditions set up, improved the reliability of the test over the same test given and scored under conventional conditions.

2. It appears that weighting for assurance in this test had the same effect as lengthening the test.

3. There are indications that there was less guessing under the method of weighting responses for assurance than under the ordinary method.

4. The type of testing here described raises a number of questions regarding the factor of assurance as it is influenced by the special conditions governing the test, and especially by the factor of personality of the examinee. Further experimentation with tests of this type should yield interesting results.

EDITORIAL

THE SUPERINTENDENCY

Authorities are pretty well agreed that the first city school superintendent in the United States was employed slightly less than a hundred years ago. His duty, as the title implies, was to superintend the schools of the city which in large measure meant to see that effective instruction was secured. In other words, the original purpose of a superintendent was to supervise instruction. Previous to that time the members of the school committee or board of education inspected the school one or more times a year as a means of checking on the instructional efficiency of the teachers.

During the years that have passed since the first superintendent was employed cities have grown tremendously and school systems expanded even more. The problems of housing, finance, curriculum, activities, service agencies, etc., are enormously more complicated today than they were a century ago. In every one of these fields as the activity became more complex and required greater technical skill, the school board has laid larger demands upon the superintendent. This has been particularly apparent in the fields of finance and buildings which from the point of view of the board is also largely a matter of finance. While a few systems have employed a business manager coördinate with the superintendent (a plan which has not proved desirable) and many others have provided a business manager under a superintendent, nevertheless the board has expected the superintendent to be an expert in many lines besides supervision.

For some time the tendency was to care for supervision through general and special supervisors. Recent years of economic stress have almost, if not quite, abolished this structure. As a consequence, the amount of actual supervision of classroom instruction or even supervision of the curriculum which is being done in a large portion of our schools is almost nil.

In recent years there has been much said and written about teacher participation in school administration. Various efforts along this line have been made by superintendents and principals and by teachers' or-

ganizations but as yet few principles have been developed which lay a firm foundation for major teacher participation in the administration of the schools. It might be inferred that teacher participation could function best in the field of instruction and curriculum yet the literature does not show us clearly how such participation should take place in order to function most effectively, the degree of participation which may be expected, or the organization which will most certainly guarantee the desired end.

Some job-analysis studies have been made of the work of superintendents and principals. A large number of status studies have been conducted on various phases of the work of the school administrator. It seems to me, however, that most studies have assumed the present type of organization, present lines of activities, in other words, present status to be the criterion against which we should measure. Is it not desirable that we should have much research of an experimental nature dealing with new concepts of administrative organization and activity? Cannot someone conceive of a functional organization which will utilize all possible teacher initiative and constructive thought? May we not hope that some way may be found to restore emphasis to learning instead of upon finance and other material factors? Research should furnish the evidence upon which the best philosophy of education can conceive may be builded into a realization.

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REVIEWS

Address all communications relative to book reviews to Editor Kai Jensen, University of Wisconsin, Madison, Wisconsin.

STRAYER, GEORGE D., FRASIER, GEORGE W., AND ARMENTROUT, WINFIELD D. *Principles of Teaching* (New York: American Book Company, 1936), pp. xii + 295. $2.00.

This book by three well known authors who have elsewhere demonstrated their understanding of education and their ability to write comes as a distinct puzzle to the reviewer. It will doubtless be no less a puzzle to any instructor attempting to use it.

In the preface occur statements of interest and promise:

"We have attempted . . . to present the conditions which make for successful living and learning in American Schools. . . . No one can teach successfully who fails to take account of the larger environment outside the school in which children live the greater part of their lives. . . . The teacher is vitally concerned with the attitude of the learner. . . . Little possibility of success without understanding and sympathy for boys and girls who vary in response. . . .

In the body of the book is found no reference whatever to "conditions of successful living" beyond an extremely brief, wholly formal, wholly abstract chapter on the aim and product of education. The entire huge literature on "life like learning" is ignored. Similarly the treatment of the "attitudes of the learner" turns out to be a formal, abstract discussion of interests and attention. No reference is made to the rich materials on pupil attitudes, behavior, personality adjustment and development. "Teaching for Character Development" is covered in an eight page chapter.

The following paragraph is significant:

"We have not been able to follow those who think of the teaching process as encompassed in a single generalization or principle but rather have sought to analyze the varying situations and to suggest principles which apply in each one of them. There is a technique which is particularly applicable when skill is to be achieved or habits fixed. While the total social situation may remain the same, the technique is quite different when one stimulates and guides children in the thinking process. When appreciation is the major consideration, the techniques employed will be different . . ."

In addition to a very probable confusion between "teaching" and "learning," there is obviously lack of understanding of the modern concept of learning wholes. This may account for the treatment of "activity teaching" in seven pages, for the omission of any basic discussion of the unit, and for the organization of the book on the "types of teaching" plan, reminiscent of the "methods" books of a decade ago.

The chapter heads are not dissimilar to those in Professor Strayer's volume, "Brief Course in the Teaching Process" published in 1911. Much of the discussion in the earlier volume is distinctly superior to that in the present book.

There is a dearth of illustrations. No questions or problems are included. The bibliographies are impossibly meager and confined largely to secondary sources. The entire treatment is of the naively dogmatic "this is how to do it" type. No scientific background is given, no authorities quoted except in a few instances. The student is to accept and practice. No initiative on his part is envisaged, no independent study leading to understanding is planned. The entire treatment of how to teach is in direct conflict with current accepted ideas of the teaching-learning process.

The hopelessly out of date conception of supervision as classroom visitation is presented, this giving the student an erroneous understanding of modern supervision. The treatment of measurement is confined to objective testing and is treated together with marks. Nothing is said of the great developments in the line of descriptive records of pupil behavior, new type report cards, etc.

The reviewer is sincerely of the opinion that this would be a distinctly difficult book to use with any level of student.

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WRIGHTSTONE, J. WAYNE. *Appraisal of Newer Practices in Selected Public Schools.* (New York: Bureau of Publications, Teachers College, Columbia University, 1935), pp. viii + 117. $1.50.

Innovations are the keys to social progress, but innovations must prove their worth through conflict with existing patterns of thought. For a decade or so, the more or less conservative educator has been asking for an objective appraisal of the so-called new practices in the education of children, but usually the response has been that the movement for such innovations is so young that no efforts at evaluation should be undertaken. However, Wrightstone, in this book, does present the results of an attempt to compare the achievement of the new and old methods of teaching in both the elementary and secondary school.

Schools in four different communities participated in the investigation. These communities varied from the small suburban city with its highly selected population to the large city with its cosmopolitan groups. Through this choice of cities, efforts were made to obtain a cross section of the average conditions prevailing in the towns and cities of the United States.

The author presents in detail the nature of the two types of practices termed *new* and *standard*. Perusal of the sections dealing with the innovations in teaching as contrasted with the standard practices will be enlightening to many teachers. While these newer methods were not uniform in the various communities, the teachers in each were certainly stressing values not usually emphasized in the ordinary teaching.

For the purpose of determining the relative achievements of the pupils in the two types of schools, the matched-pair technique was used. In the systems concerned, groups of pupils having teachers of comparative ability were matched according to intelligence quotients and chronological and socio-economic bases. The only variable was method, for it was possible to eliminate other factors. Three types of evaluations were made: intellectual factors and outcomes, through the administration of achievement tests; dynamic factors, through the use of questionnaires on interests and attitudes; performance factors in group discussion and recitation, through the application of the controlled-observation technique. These evaluations represented efforts to measure not only the more traditional types

of educational achievements but also those types emphasized by the new educator.

The general results of the investigation showed that the procedures in the newer schools were superior in all three types of educational values measured. In the new type of instruction the pupils achieved as high or higher scores on the standardized subject matter tests and on those tests involving attitudes, interests, personal and social adjustments and character traits. While the author does not make sweeping generalizations, he suggests that proponents of the new education may proceed with the knowledge that such procedures will not cause a sacrifice in the mastery of knowledge and skills usually achieved through the procedures emphasized in the standard schools.

This book should be of interest to teachers, superintendents and research workers in education. It should indicate to teachers and superintendents the contrast in the values emphasized in the new and standard schools and remove the fear of sacrificing the mastery of fundamentals in their effort to emphasize the new practices and procedures. It should be helpful to research workers in that it uses new techniques for evaluation of the more or less intangible results of education. The case for progressive education will be made through investigations such as described in this volume.

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ROOD, DOROTHY. *The Nurse and Parent Education.* Child Development Monographs, No. 19 (New York: Bureau of Publications, Teachers College, Columbia University, 1935), pp. xiii + 87. $1.50 (paper $1.00)

The purpose and scope of this study can best be given by listing the five questions which the investigator set out to answer and to indicate briefly the method followed. The first question relates to the nurse's responsibility for parent education. "Is parent education a function inherent in the work of all nurses or is it a special field for which certain nurses might be prepared?" To answer this query, the investigator submitted a comprehensive list of 126 questions dealing with child development to 201 nurses and asked them to indicate the approximate frequency with which they were asked each question. All of the subjects checked one or more questions. From this the author concludes that parent education is a function of all nurses.

To answer the second question, "Does the present preparation of nurses fit them adequately to deal with the questions and problems of parent education?" the investigator asked the subjects to indicate to what extent they felt themselves prepared to deal with each question mentioned. All subjects indicated that they felt a need for further preparation although there were some differences between nurses and supervisors of nurses.

The third question, "What questions or problems relating to parent education are nurses likely to meet?" the investigator attempts to answer by tabulating the frequency with which the question occurred in the experience of the 201 nurses.

To determine the relative importance of the problems in the comprehensive list, twelve specialists in the field of nursery education, child development and parent education were asked to indicate their judgment of the relative importance of each problem.

The final query, "What changes should be made in the present basic preparation required of nurses to fit them more adequately for parent education?" is treated analytically. The author emphasizes three particular needs. Many nurses do not

regard parent education as an inherent part of their work. They do not have adequate knowledge of well children and there should be less difference than now exists between the present best practice for handling children in hospitals and nursery schools.

The investigator does not always make a clear distinction between "nurse education in child development" that is, the education of nurses in the understanding of children and "parent education in child development" that is, guiding the parent in his development of an understanding of the child. It appears that the author has the second meaning in mind and it is the meaning that will be used in this analysis.

This study falls in an important area. It is unfortunate, therefore, that the methods used do not appear to be adequate to make a distinct contribution to the problems which the investigator sets out to solve. The fact that nurses are asked questions does not prove that their function is parent education. Almost everyone is asked many questions about disease but that does not prove that it is everyone's function to practice medicine. A more thorough analysis of the problem will show that the question is essentially the important one of the distribution of function between the various groups or agencies in society and that we must have data as to the effects of different allotments of function.

Furthermore, it is difficult to justify the method used in studying the adequacy of the present preparation of nurses. Nurses were asked to indicate to what extent they *felt themselves* prepared to meet a given problem. Why use this method when the more thorough method of *testing* their adequacy is available?

Finally, the whole study rests on the assumption that problems and content are synonymous as far as the curriculum is concerned. The error of this assumption becomes clear when it is remembered that there is no necessary relationship between the overt form or the statement of the problem and the generalizations, etc., needed to solve it. In fact, the number of different problems to which a generalization can be applied is practically limitless and the fundamental elements are not the problems themselves but the generalizations, attitudes, emotional patterns, and the like required to attack the problems. Education consists in developing and understanding of generalizations, modifying attitudes, etc., so that the individual can attack many related problems. Education does not consist in answering single or isolated problems.

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KANE, W. *An Essay Toward a History of Education Considered Chiefly in Its Development in the Western World* (Chicago: Loyola University Press, 1936), pp. xvi + 637. $2.40.

In comparison with a detailed and comprehensive history of education, this is not a large work yet an essay of 600 pages is a sizable essay. It is, of course, a textbook and with library-work to supplement it, there is material enough for a semester-course. Few recent textbooks deal with Oriental education so that restriction to the western world is now standard. The present work includes the Hebrews as influencing the western tradition. There is also a chapter on primitive education. But the most unusual addition to the scope of the ordinary text is the treatment of education in Spain and Latin America. Considerable space is given to the school systems of the United States, Canada, the larger countries of western Europe, Russia and Japan. The author follows common practice in stressing

theory, studies and method in the older periods and, in the modern, transferring considerable attention to institutions and administration. It is true that "systems" are a large feature but aims and methods are not less important than they were in earlier times. The spectacular spread of national education in the last two centuries has so impressed our historians that they tend to change their perspective as they approach the contemporary period. The present volume maintains the same outlook throughout better than most.

In its free use of sources in several languages and in its general scholarship this book is superior. The author, incidentally, was in part educated in Spain. He is, as the preface states, a Catholic priest who has tried to be fair in the conflict between Catholic and anti-Catholic prejudice; and he seems to have succeeded at least as well as most writers on the other side. It cannot be said, however, that he is impartial on such topics as secularism, democracy, (which is printed in inverted commas), national control or the tendencies of progressive education. The book is interesting and stimulating. It is well-informed; contains new matter and ideas; is well-organized. Its elaborate documentation and bibliographic notes at the end of each chapter are valuable features.

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Stacy, William Homer, *Integration of Adult Education: A Sociological Study.* Contributions to Education, No. 646. (New York: Bureau of Publications, Teachers College, Columbia University, 1935), pp. vii + 148.

Mr. Stacy presents in this volume orientation to social philosophy in adult education. He recognizes with others working in the field that there are many agencies and organizations engaged in activities which are classified as adult education. Accordingly, he discusses integration in terms of several objectives.

The author's experience as an agricultural extension worker is reflected in the second chapter which is an adequate and comprehensive discussion of the agricultural extension program. Although this particular chapter does not seem to be necessary for the author's thesis—the integration of adult education—its unusual merits should be recognized.

A question as to whether or not rural and urban adult education programs should be integrated is discussed with the pros and cons ably presented. Another topic treated by Mr. Stacy is entitled "The Philosophical Unity for Adult Education in the Seven Great Arts." The seven arts to which he refers are: 1. Perfecting philosophies. 2. Advancing coöperation. 3. Using science. 4. Increasing incomes. 5. Improving uses of income. 6. Improving uses of time. 7. Advancing beauty. Each of these objectives and principles of adult education is introduced by a quotation.

I cannot refrain from requoting here a gem on coöperation (the second great art) uttered by the silent spokesman during the twirling twenties for the party of rugged individualism. Mr. Coolidge combined his higher mathematics with profound sociology to emerge with the following increment to wisdom: "The power of civilization was first learned when it was found that two men could roll a larger stone than one. The measure of a people's civilization is their ability to work together."—Calvin Coolidge.

In order to secure opinions concerning various purposes which might improve adult education, inquiries were sent to 315 individuals including state commis-

ioners of education, directors of state co-operative extension services, directors of college and university extension divisions, state librarians, directors or secretaries of religious education councils, and secretaries of adult education councils. A detailed record of their responses is included.

Although frontier thinkers in adult education are quoted by Mr. Stacy, most of them were not reached by this inquiry. A few frontier thinkers can, of course, contribute more significant ideas to the problems of adult education than can all the "workers" in the field. When seeking opinions it is probably more important to question a few scholars in adult education than several hundred individuals most of whom are only on the "experience level."

Mr. Stacy's work is to be highly commended, although it would have been stronger had it not been so closely anchored to agricultural extension, a phase of adult education not noted for its vitality. The author presents many problems and introduces the reader to numerous possibilities for solving them. The discussion proceeds very well and is frequently supported by quotations from many authors. The bibliography is very extensive.

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RESEARCH ABSTRACTS and BIBLIOGRAPHIES

Address all communications relative to research abstracts and bibliographies to A. S. Barr, University of Wisconsin, Madison, Wisconsin.

BULLETINS

CAMERON, MAXWELL A. *The Financing of Education in Ontario,* Bulletin No. 7 of the Department of Educational Research, (Toronto: Department of Educational Research, 1936), 175 pp.

This bulletin is the seventh in the series published by the Department of Education of the University of Toronto, and contains a discussion of financing education in Toronto.

CARR, WILLIAM G., AND OTHERS. *The Preparation of Teacher's Salary Schedules,* Part 1. Administrative and Fact-Finding Procedure, Research Bulletin of the National Education Association, XIV, No. 1 (Washington: National Education Association, 1936), 45 pp.

This bulletin offers a discussion of the administrative procedures in preparing and adopting new salary schedules, gathering and presenting the facts, references to other studies and other pertinent data.

CARR, WILLIAM G., AND OTHERS. *Reconstructing Education Through Research* (Washington: American Educational Research Association, 1936), 301 pp.

A report of the papers presented at the St. Louis meeting of the American Educational Research Association.

COVERT, TIMON. *State Provisions for Equalizing the Cost of Public Education,* Bulletin No. 4 (Washington: United States Department of the Interior, 1936), 49 pp.

This bulletin contains a discussion of the states' responsibility for education, examples of public education chiefly at expense, apportionment methods, and recent increases of state funds for education.

DAVIS, MARY D. *Young Children in European Countries,* (Washington: United States Department of the Interior, 1936), 108 pp.

A discussion of the training facilities for younger children in Great Britain, Russia, Italy, Belgium, and other European countries.

DOUGLASS, AUBREY, A. *Recent Developments in Secondary Education in California,* Bulletin No. 6 (Sacramento, California: Department of Education, State of California, 1936), 51 pp.

This bulletin contains an ancient account of the developments in a group of secondary schools coöperating with the State Department of Public Instruction in devising better curricula.

EISENSON, JON. *Confirmation and Information in Rewards and Punishments* (New York: Archives of Psychology, 1935), 37 pp.

An experimental study of reward and punishment in learning from which the author concludes that learning unquestionably takes place if information is withheld and nothing but the satisfying influences of the reward operates, but

the amount of learning is markedly increased when specific and usable information is added to the reward.

ENGELHARDT, N. L. *Elementary School Building Score Card and Service Manual* (New York: Bureau of Publications, Teachers College, Columbia University, 1936), 46 pp.

Contains standards on the school site, building, service systems, classrooms, kindergarten, special activity rooms, general service rooms, and administration.

FRANKE, VICTOR. *La Législation Régissant Les Constructions Scolaires*, Publications du Bureau International D'Education, No. 47 (Geneva: Bureau International D'Education, 1936), 200 pp.

This bulletin presents a summary of legislation relating to the construction of school buildings for some 37 countries furnishing the necessary information.

GLUECK, ELEANOR T. *Evaluative Research in Social Work* (New York: Columbia University Press, 1936), 27 pp.

A discussion of evaluative research wherein systems of treatment are evaluated in terms of objectives.

GREENLEAF, WALTER J. *Junior Colleges*, Bulletin No. 3 (Washington: United States Department of the Interior, 1936), 86 pp.

The author discusses the control of the junior college, recent changes in the status of junior colleges, with a survey of many items relative to the establishment, staff, enrollments and similar information about junior colleges.

Our Schools and Our Teachers. (Madison: Wisconsin Education Association, 1936), 48 pp.

This bulletin is a revision of the previous bulletin of the Wisconsin Education Association on *Educational Trends* offering most recent data on educational trends from 1925 through 1935.

PALFREY, THOMAS R., AND COLEMAN, HENRY E. *Guide to Bibliographies of Theses in the United States and Canada* (Chicago: American Library Association, 1936), 48 pp.

The authors furnish a guide for the location of doctoral dissertations in the different fields of research.

PETERS, CHARLES C. *Abstracts of Studies in Education at the Pennsylvania State College*, Penn State Studies in Education, No. 12 (State College: Pennsylvania State College, 1936), 68 pp.

Contains abstracts of some 31 theses completed at Pennsylvania State College.

REISNER, ELIZABETH J., DE ONIS, HARRIET, STOLPER, THALIA M. *Parents and the Latch-Key.* The Horace Mann Parents Association and the Parent-Teacher Association of Lincoln School (New York: Bureau of Publications, Teachers College, Columbia University, 1936), 56 pp.

Concrete discussion of problems of the home and adolescence; opening the door into the home; parents standards and youth's social life, how parents can help when young people are not using the latch key wisely, parents working together, and keys to knowledge of the meaning of life.

Statistics of State School Systems, 1933-34, Chapter II of the Biennial Survey of Education in the United States (Washington: United States Department of the Interior, 1936), 111 pp.

The Biennial Survey of Education in the United States discussing the enrollment, attendance, administrative officers,

the teacher, financial support, expenditures, school properties, school debt, and urban and rural school statistics.

WEEKS, RUTH MARY. *A Correlated Curriculum.* English Monograph No. 5, National Council of Teachers of English (New York: D. Appleton-Century Co., 1936), 326 pp.

The National Council of Teachers of English offers, in this bulletin typical proposals for the correlation of English with other subjects of instruction.

WEERSING, FREDERICK J. *Annotated Index of Theses and Dissertations in Education* (Los Angeles: Alpha Epsilon Chapter of Phi Delta Kappa, 1936), 133 pp.

The author presents an annotated list of theses prepared at the University of Southern California 1911-1935.

WIGHT, EDWARD A., AND CARNOVSKY, LEON. *Library Service in a Suburban Area* (Chicago: American Library Association, 1936), 162 pp.

A survey of the library service of Westchester County, New York, discussing the wealth and the population of the county, the library facilities; book collections, use of the library services, library finance, and the school library service, with a summary and recommendations.

WOODY, CLIFFORD. *Sophomore Testing Program in the Accredited High Schools of Michigan,* Bulletin No. 148 Bureau of Educational Reference and Research (Ann Arbor: University of Michigan, 1936), 95 pp.

Contains a discussion of the purposes of the testing program, general levels of achievement, the selective character of different curricula, courses, and activities; the college intentions and vocational choices of these high school pupils; other facts of importance and suggested problems for further study.

ADMINISTRATION AND SUPERVISION

DOUGLASS, HARL R., AND CAMPBELL, INA. "Factors Related to Failures in a Minneapolis Junior High School," *The Elementary School Journal,* (November, 1936), pp. 186-189.

A study of the records of 37 failing pupils in a Minneapolis Junior High School to discover related factors.

DOUGLASS, HARL R., AND MICHAELSON, JESSIE H. "The Relation of High School Mathematics to College Marks and of Other Factors to College Marks in Mathematics," *The School Review* (October, 1936), pp. 615-619.

From a study involving 387 students of the University of Oregon the authors conclude that beyond the first two years additional work in high school mathematics does not contribute materially to success in the first two years of the liberal arts college.

SHANNON, J. R. "Teachers Attitude Toward Supervision," *Educational Method* (October, 1936), pp. 9-14.

From a questionnaire study of the reactions of 481 teachers to supervision the author reports that over 86 percent regarded scientific democratic supervision as helpful and welcome.

SUTCLIFFE, A., AND CANHAM, J. W. "Mental Fatigue and a Longer School Day," *British Journal of Educational Psychology* (November, 1936), pp. 274-290.

From an experimental study carried on in the Cambridge Training School the authors conclude that a lengthened school day of one hour from 4:00 to 5:00 P.M. produced noticeable fatigue.

PSYCHOLOGY OF LEARNING AND TEACHING

CONNOR, WILLIAM L., AND HAWKINS, GERTRUDE C. "What Materials Are Most Useful in Learning to Solve Problems," *Educational Method* (October, 1936), pp. 21-29.

From a study of the materials of instruction employed in the teaching of pupils how to solve problems in the Cleveland Junior High Schools the authors conclude that the best materials are those chosen by the pupils themselves from their environment.

DOUGLASS, HARL R., AND FIELDS, GEORGE H. "An Experimental Comparison of the Daily-Assignment, Daily Recitation and the Unit Assignment in High School Chemistry," *Science Education* (October, 1936), pp. 141-145.

From an experimental study carried on in West High School, Waterloo, Iowa, the authors conclude that neither method appears to be distinctly superior to the other.

MOORE, JAMES H. "The Role of Determining Tendencies in Learning," *American Journal of Psychology* (October, 1936), pp. 559-571.

An experimental study of learning from which the author concludes that purpose and mind set influence greatly the organization, assimilation and recall of sense materials.

PETERS, HENRY H. "The Relationship Between Familiarity of Words and Their Memory Value," *American Journal of Psychology* (October, 1936), pp. 572-584.

An experimental study indicating that the familiarity of words is a factor influencing its memory value.

TATE, HARRY L. "An Evaluation of the Project Method," *Elementary School Journal* (October, 1936), pp. 122-132.

From an experimental study carried on with 237 pupils in Grades IIA, IVA and VIIIA of the Whitney School in Chicago. Project taught children appeared to do less than non-project children.

CURRICULUM

HOCKETT, JOHN A., AND NEELEY, DETA P. "A Comparison of the Vocabularies of Thirty-three Primers," *Elementary School Journal* (November, 1936), pp. 190-202.

A detailed analysis of the vocabulary load of thirty-three primers. From the analysis it was found that the number of different words varied from 175 to 480 words per book with an average repetition of 18.2 words.

WINKOUR, MORRIS. "A Survey of Generalized Science Courses in Institutions of Higher Education," *Science Education* (October, 1936), pp. 132-140.

From 144 returns of a questionnaire sent to 172 institutions offering general science courses the author presents data relative to the purpose, conduct, and enrollment of general courses.

MEASUREMENTS, STATISTICS, AND SCIENTIFIC TECHNIQUES

DOWNING, ELLIOT R. "Some Results of a Test on Scientific Thinking," *Science Education* (October, 1936), pp. 121-128.

The author presents a test of scientific thinking with certain preliminary results.

TRAXLER, ARTHUR E. "The Use of Test Results in Diagnosis and Instruction in the Tool Subjects," *Educational Records Bulletin*, No. 18 (New York: Educational Records Bureau, 1936), 74 pp.

Contains a discussion of general considerations in the use of test results, suggestions for diagnosis and remedial teaching in the tool subjects, and bibliography.

RUNDQUIST, E. A., AND SLETTO, R. F. *Minnesota Scale for the Survey of Opinions* (Minneapolis: University of Minnesota Press, 1936.

This is a short battery of scales to measure morale, feelings of inferiority, family adjustment, attitude toward law, economic conservatism and attitude toward education. Data on reliability and validity are contained in a monograph, "Personality and the Depression" also published by the University of Minnesota Press.

TYLER, RALPH W. "Needed Research in the Field of Tests and Examinations," *Educational Research Bulletin*, College of Education, Ohio University XV (September 16, 1936), pp. 151-158.

The author discusses the many needed improvements in tests and other instruments such as better definition of the abilities to be measurerd, more attention to validity, reliability, and objectivity, greater provision for short unit tests, and the integration of test scores.

MISCELLANEOUS

CHARTERS, W. W. "Projects of the Bureau of Educational Research," *Educational Research Bulletin*, XV, No. 7 (Columbus, Ohio: Bureau of Educational Research, 1936), 27 pp.

The author and others present a description of the projects of the Bureau of Educational Research of Ohio State University.

WEST, ROBERT. "Is Stuttering Abnormal?" *Journal of Abnormal and Social Psychology*, XXXI (April-June), pp. 76-86.

The author summarizes the facts supporting the different theories relative to stuttering and concludes that stuttering is not the result of psycho-neurosis or abnormalities of the speech mechanism but the product of a natural condition since speech itself is an unnatural function.

RESEARCH NEWS and COMMUNICATIONS

Address all research news and communications to Carter V. Good, Teachers College, University of Cincinnati, Cincinnati, Ohio.

1937 Yearbook.—The next yearbook of the National Society of College Teachers of Education is entitled, "The Use of Background in the Interpretation of Educational Issues." The Editorial Committee consists of Charles F. Arrowood (Chairman), University of Texas; T. H. Benner, University of Illinois; Edgar W. Knight, University of North Carolina; Philip W. L. Cox, New York University; and John S. Brubacher, Yale University. The section on the natural sciences was written under the direction of S. Ralph Powers of Columbia University, who prepared a chapter in this section. Other chapters on the natural sciences deal with biology (Elftman and Dunn), physics (Roller), and psychology (Hartman).

The authors and titles of other chapters are as follows: Charles H. Judd, University of Chicago, "The Scientific Study of Social Trends as a Background for the Interpretation of Educational Issues," Newton Edwards, University of Chicago, "The Legal and Governmental Bases for the Support and Control of Education in the United States;" I. L. Kandel, Columbia University, "National Backgrounds of Education;" Edward H. Reisner, Columbia University, "The More Effective Use of Historical Background in the Study of Education;" Charles F. Arrowood, University of Texas, "Educational Issues in the Light of Contemporary American Philosophy;" and A. O. Hansen, College of the City of New York, and Clark Wissler, American Museum of Natural History, a chapter on education in the light of anthropology.

An introductory chapter was written by Philip W. L. Cox and Charles F. Arrowood, with a concluding chapter on making background available to students of education by Professors Cox and Brubacher.

An attempt was made to maintain the unity of the yearbook by writing it in accord with principles agreed upon in a meeting of the Yearbook Committee and by constant correspondence between the chairman and the authors of the various sections.

Survey of Visual Instruction.—City and county public school superintendents and principals of private high schools in 9,000 communities throughout the country supplied information to the United States Office of Education and the American Council on Education in a recently completed National Visual Instruction Survey. The findings of the survey, which covered visual and audio aids offered 17,000,000 pupils and brought information from 95 percent of all cities with a population of 5,000 or more, have been published by the American Council in the form of a directory of visual education.

With few exceptions the 280,000 public and private schools of the country are poorly equipped with motion-picture projectors, film supplies, radios, and other visual-audio aids necessary for the transmission of knowledge and ideas with the effectiveness which is now possible.

Only 750 sound motion-picture projectors were reported as belonging to the Nation's schools. More than half of the 81,000 schools reporting are electrically equipped. Lantern slides, motion picture, and radio equipment owned by 42,000 schools include 27,000 lanterns and other types of slide projectors, 9,000 silent and 750 sound-motion-picture projectors, 11,000 radio receiving sets, and 850 central radio sound systems. There is also considerable renting and borrowing of this type of equipment.

More schools report using motion pictures for teaching of science than for instruction in any other school subject. Next comes the field of travel and geography, and then history, social science, health, English, nature study, and commerce and industry.

Carnegie Corporation.—The report of the Carnegie Corporation of New York for the year ended September 30, 1936, reveals that its total expenditures for the five-year period, 1931-1936, exceed $25,000,000. The activities of the past year have been concerned with general education, adult education and related activities, the library, fine arts and museums, scientific research, useful publications, certain new fields, and the British Dominions and Colonies. An important transaction of the year was the capitalization of the Teachers Insurance and Annuity Association through a grant of $6,700,000. In the field of general education support has been given to the eight-year Pennsylvania study of the relation between secondary schools and colleges, the International Inquiry on School and University Examinations, the Australian Council for Educational Research, the New Zealand Council for Educational Research, and the South African National Bureau of Educational and Social Research.

The report contains a critical discussion of the use of philanthropic resources, with an analysis of the chief ways of distributing foundation funds.

"During the past ten years, foundation gifts for the general support or endowment of educational institutions have dropped rapidly. Gifts for the annual support of various voluntary, non-profit-making organizations, once widely distributed, are becoming more strictly limited to those more or less closely identified with the program of the foundation itself. Following the concentration upon college and university endowments of the early twenties came a series of large single grants to meet the anticipated budget of some comprehensive study or demonstration to be carried on over a term of years. These in turn are being succeeded by the support of selected enterprises which begin more modestly and for which grants are made in successive years in the light of experience and accomplishment. A further line of attack open to a foundation is through the direct support of an individual as an individual, not as a member of a university faculty or inquiry staff or research group. The evidence is not clear as to whether this type of grant is as a whole gaining or losing favor among foundations. These five types cannot be sharply differentiated; they tend to run into one another, but on broad lines they represent the chief ways of distributing foundation funds. All have their advantages and their dangers."

Studies of English.—Each year the National Conference on Research in Elementary School English prepares and issues a bibliography of unpublished studies in elementary school English. The Committee assigned to prepare the bibliography for report in February, 1937, is now at work and will appreciate receiving information about such studies completed during 1934-35 and 1935-36. Informa-

tion may be sent to the chairman of the Committee, Miss Bess Goodykoontz, U. S. Office of Education, Washington, D. C.

Comprehensive Examinations in Chicago.—Survey courses in biological science, English, humanities, physical science, and social science are required of all students in the Chicago City Junior Colleges. Upon the completion of one year of study in any of these courses, a student is given a comprehensive examination in the subject. The examination, which is designed for a testing-time of three hours, is a litho-printed booklet of approximately twenty pages of objective exercises and one or two essay questions. It is prepared and administered by the Department of Examinations with the assistance of the instructors of the survey course in the three colleges. The scoring of all of the comprehensive examinations is supervised by the Department of Examinations. Graduates of the Chicago Normal College score the objective exercises, and selected university graduates score the essay questions. The marks, which are affixed by the Department of Examinations, are those which the students receive as final marks for one year of study in any given survey course.

An analysis of the examinations by M. D. Engelhart, of the Department of Examinations, supports the contention that the survey courses qualify as survey courses in that the abilities required are largely common. While special talent may be necessary for superlative achievement in a given survey course, average or even superior achievement is possible for the student of average or superior status with respect to the general ability. Conversely, satisfactory achievement in a given survey course is possible for any student whose achievement in the other surveys is satisfactory. If a student's achievement in one survey course is unsatisfactory while his achievement in the others is satisfactory, the failure is probably the result of lack of interest because of inadequate motivation rather than the result of lack of some special ability.

Articulation of High School and College.—The University of Buffalo, under a grant from the General Education Board, has printed a second group of research bulletins devised to promote the interests of the superior student in college. These studies are concerned with the prognosis, training, and examining of those well motivated and able students who are capable of a heavier and more flexible program than is customary. The editor is Edward Jones of the University of Buffalo. The authors are Henry C. Mills, Mazie E. Wagner, Ruth E. Eckert, Mary E. Sarbaugh, and Eunice Strabel. The second series (1936) includes nine bulletins.

New Sociological Journal.—The fifth number of the first volume of the *American Sociological Review* appeared in October. It is the official organ of the American Sociological Society. The editor is F. H. Hankins of Smith College.

Pennsylvania Projects in Secondary Education.—The Pennsylvania branch of the National Department of Secondary School Principals is studying the following areas or problems: state scholarship examinations, the activities of local associations of secondary school principals in Pennsylvania, relation between the Pennsylvania branch of the Department of Secondary School Principals of the N. E. A. and the Department of Secondary School Principals of the P. S. E. A., commencement programs, promotions, failures, drop-outs in high school, the home room in the school program, school and community relations, student participation in the school program, extension of education for older youth, follow-up

study of high school graduates, educational adjustments in secondary schools for the exceptional pupil of high native ability, teacher qualifications and salaries in the small high school, character education, secondary school standards, records and reports, survey of the more common guidance practices in Pennsylvania, interschool relations, realism vs. idealism in education, secondary school and college relations, and secondary school curriculum revision.

Forum and Radio Projects.—Further assistance in the development of two important educational frontiers, civic education for adults and education by radio, is assured by new grants of emergency funds. For continuation and expansion of civic education through public forum centers, the sum of $330,000 has been allocated to the United States Office of Education, which, in turn, will transmit the funds to superintendents of schools who are organizing forum centers for demonstrating new methods of practical adult education for citizenship. The new funds will make possible ten new public forum centers in addition to the ten centers now being operated.

To continue the experiments and demonstrations in techniques necessary for successful use of radio for education, President Roosevelt has allocated $113,000. The grant for educational radio demonstrations will permit the continuance of the Educational Radio Project through June, 1937. In eight months this project has shown how public educational agencies can successfully use radio in the service of education.

Research Division, N.E.A.—With the November *Research Bulletin*, "Safety in Pupil Transportation," the Research Division of the National Education Association completes the fourteenth volume of this series. Other bulletins issued during 1936 include: "The Preparation of Teachers' Salary Schedules: Part I, Administrative and Fact-Finding Procedures" (January); "The Preparation of Teachers' Salary Schedules: Part II, Drafting the Schedule" (March); "The Efforts of the States to Support Education" (May); and "A Handbook on Teacher Tenure" (September).

During 1937 the Division plans to prepare bulletins on the following topics: school costs, salaries of school employees in 1936-37, the social studies curriculum, student personnel practices in secondary schools and colleges, and rural education.

Each year a number of the committees of the National Education Association call upon the Research Division for assistance in the formulation of reports. To date definite plans have been completed to assist the Tenure Committee with three studies: court decisions on tenure reported in 1936, minimum salary laws, and uniform state contracts.

The 1937 Yearbook of the Department of Superintendence, prepared under Chairman Frank G. Pickell, superintendent at Montclair, New Jersey, will be available in February, 1937. The title of this volume will be, "The Improvement of Education: Its Interpretation for Democracy." It is a yearbook on educational interpretation which reaches back into the social scene for principles to guide programs of public relations and publicity.

The 1938 Yearbook on problems of youth is now being prepared under Chairman E. E. Oberholtzer. It is hoped that this yearbook will select from a much talked about and perplexing area some definite suggestions for the improvement of secondary education. Some examination will be made of the relationships which exist between so-called youth organizations and the public schools. The

final report will be distributed to the members of the Department in February, 1938.

The Research Division is assisting the Department of Classroom Teachers to prepare two reports. One of these deals with teacher health and the other with the applications of research to instruction. Both studies have been reported in some detail in previous issues of the *Journal of Educational Research* (September and December, 1935).

The Fifteenth (1936) Yearbook of the Department of Elementary School Principals entitled, "Personality Adjustment of the Elementary-School Child," is now available. It deals with pupil growth, guidance, and adjustment with special emphasis upon the mental and emotional health of children and teachers. The Sixteenth (1937) Yearbook, now in preparation, will deal with the topic of "Appraising the Elementary-School Program." A wide range of school policies and procedures will be covered, including those involved in school organization, administration and supervision, the curriculum, teaching methods, special group activities, and the pupil-guidance program. In each of these fields, the major emphasis will be placed upon methods or techniques of evaluation in actual school situations, rather than upon a mere description of school policies or practices which are believed to be good. Anyone interested in submitting material for this volume should communicate at once with the Editorial Committee, Department of Elementary School Principals, 1201 Sixteenth Street, N. W., Washington, D. C.

In coöperation with the Department of Superintendence, the Research Division maintains a subscription service (Educational Research Service). School systems, professional libraries, and other subscribers receive assistance with their problems and a variety of special studies and publications. Among the circulars recently issued are the following:

1. *Education in Lay Magazines* is an abstract of articles on education in non-educational magazines and is prepared five times a year. Educational Research Service Circulars Nos. 1, 4, 6, and 9, 1936, are devoted to this topic.

2. *Size of Class in Public Schools,* Circulars No. 5 and No. 7, report information on a city-by-city basis for the school year 1935-36, for 61 cities over 100,000 in population, 139 cities 30,000 to 100,000 in population, and 82 cities under 30,000 in population. They make comparisons with a similar study for 1930-31.

3. *Questionnaire Studies Completed,* 1935-36, Circular No. 8, 1936, presents the seventh bibliography of studies resulting from questionnaires distributed to superintendents of schools by questionnaire investigators in all parts of the country.

4. *Trends in Restoration of Teachers' Salaries,* News Bulletins Nos. 1-5, 1936, report continued progress for restoration of normal salary schedules in city school systems. These bulletins give information for approximately 275 cities.

This information was forwarded by F. W. Hubbard, Associate Director of the Research Division.

Educational Policies Commission.—The Educational Policies Commission was appointed in December, 1935, by joint action of the Executive Committees of the National Education Association and the Department of Superintendence. The Commission was created for a five-year period and is financed separately from the National Education Association budget by a grant from the General Education Board.

The Commission is not a research or standardizing agency. It seeks, through

coöperative means, to develop for American education long-term policies which will merit the united support, not only of the profession, but of all citizens.

The major projects which the Commission has under preliminary consideration include the following:

1. A statement of the unique place of education in a democratic society. This statement is being prepared in collaboration with a noted historian. It will review carefully the position accorded to education by the founders of the republic and trace the development of that concept through the period of the Jacksonian democracy and the activities of the great humanitarians, such as Horace Mann, down through the social and economic adjustments of the present day.

2. A catalog of human needs and services, on the basis of which an attempt will be made to distinguish between educational services and those which might be defined as custodial or welfare in nature. From this analysis, there should emerge a better understanding of the functions of a public school system as a part of a comprehensive community program of public service.

3. A statement of financial policies for American education, drawn in the light of current economic conditions and possible future developments. In connection with this problem, the Commission has conferred with economists and political scientists.

4. A statement of the educational implications of various types of population changes. This study of the human resources to be served by the educational program will be conducted with the assistance of competent specialists in population problems.

5. A restatement of the objectives of American education in the light of the analyses mentioned above.

6. A statement of policy with reference to certain immediate problems in secondary education.

7. A statement of fundamental principles underlying the professional organizations in the field of education. This is being prepared in accordance with a resolution requesting such a study, passed by the Department of Superintendence of the National Education Association in February, 1936.

8. A manual on educational planning to be published in coöperation with the National Resources Committee and the several state planning boards.

9. An outline of research problems arising out of the impact of the depression upon education. This project is conducted in coöperation with the Social Science Research Council.

Publications and inquiries issued by the Commission include:

1. A pamphlet entitled "Some Current Problems in American Education," listing issues which the Commission desired to have widely discussed at teachers' meetings, educational conventions, public forums, civic clubs, and the like.

2. A leaflet entitled "Deliberative Committee Reports of 1935." This leaflet is a step toward the development of a clearing-house for the important recommendations formulated by national deliberative committees working in the field of education.

3. An inquiry blank listing a series of problems relating to the objectives of education, on which the advice and opinion of the Consultants are being sought.

4. An inquiry blank on professional organizations.

5. Addresses on the work of the Commission by A. J. Stoddard, and F. M. Hunter.

6. An inquiry blank on the social services of the schools.

Copies of the publications listed above are available on request. The secretary

of the Commission is William G. Carr, who prepared this statement.

Effect of the Depression on Education.—Educational research workers may be interested in a monograph now being prepared by the Educational Policies Commission which will outline a series of recommended investigations concerning the effects of the business cycle on education. Similar reports in other fields are being drafted by experts in welfare work, population problems, and in each of the other major areas of sociological research. The entire series of monographs will be issued early in 1937 by the Social Science Research Council.

J. B. Sears, of Stanford University has been appointed to the staff of the Educational Policies Commission for a period of three months to develop the monograph in the field of education.

The principal part of the monograph, as planned at present, will present a carefully selected list of research problems representative of all parts of the field, and in each case with hints of kindred problems. The problems may be classified and set up under such practical headings as:

(a) Historical and comparative—showing trends.
(b) Theories of education (social, political, psychological, biological).
(c) The school population.
(d) The instructional program.
(e) The staff personnel.
(f) Instructional processes.
(g) The school properties.
(h) Organization and administration, including public relations.
(i) Finance and business.
(j) Scientific and professional organizations and activities.

At best only a limited number of problems can be presented. To have these representative will be the aim in order to stimulate thought along as many lines as possible.

In each instance a clear statement of the problem will be made; its importance will be suggested and explanation made of how to attack it; e.g., where data may be obtained, what previous investigations there are that contribute, and where to turn for general background treatments, if any.

Preliminary and incident to the task of developing this monograph, a reasonably complete bibliography for the problem is being developed, and as a far as possible annotated and classified. A review of this material should make clear the need for and to some extent should dictate the nature of this monograph.

A more complete outline of the proposed monograph will be sent on request. Comments and suggestions regarding this project from educational research workers will be especially welcomed by William G. Carr, Secretary, Educational Policies Commission, 1201 Sixteenth Street, Northwest, Washington, D. C.

The Depression and Higher Education.—In the fall of 1935 a special Committee of the American Association of University Professors began a study of the effect of depression and recovery on higher education. The members are: F. K. Richtmyer, Cornell University, Chairman; O. W. Caldwell, Columbia University; A. J. Harno, University of Illinois; Sumner H. Slichter, Harvard University; and Malcolm M. Willey, University of Minnesota, who prepared the present statement. The study was financed by a small grant from the Carnegie Foundation for the Advancement of Teaching. In planning its procedures the committee had first to decide whether it would, with its limited resources, undertake an intensive investigation of one or two spe-

stalized problems, or whether it would make a more general, exploratory study that would seek to chart a broad field and raise for discussion a large number of questions. The latter course was decided upon, and the program of work was outlined in the "Effect of Depression and Recovery on Higher Education," appearing in the *Bulletin* of the Association for January, 1936, pages 25-41. The Committee first undertook a preliminary study of problems related to the present status of the teaching profession. The results appeared under the title, "Employment, Salaries, Promotion, and Tenure in Higher Education: Present Practices," in the *Bulletin* of the Association, March, 1936, pages 168-182. In the *Bulletin* for October, 1936, the Committee also reported on "How Professors Have Reacted to the Depression."

The Committee's studies are now nearly completed. It will report upon its finished work at the annual meeting of the American Association of University Professors to be held in Richmond, Virginia, in December. Its final report will be issued in book form as early as possible after the first of the year. As now planned, in first draft, this complete report will be organized into seven major sections:

Part I, The Introduction: The Problem and Its Setting.

Part II, The Present Status of the Depression, in which will be reviewed employment, salary, promotion, and tenure policies, with some consideration also of the factors that may have influenced the quality of the teachers' work during the depression period. This section will also raise general questions concerning faculty participation in policy formation.

Part III, The Finances of Higher Education: Income and Expenditures.

Part IV, Enrollments during the Depression Years: Enrollments and Degrees.

Part V, Students and Their Problems during the Depression.

Part VI, The Relation of the Federal Government to Higher Education during the Depression Years.

Part VII, The Public Relations of Higher Education During the Depression. A concluding section will draw together the general implications of the data that have been analyzed.

The Committee makes no pretense to exhaustive treatment of these topics, but it has aimed to raise significant problems for discussion and to indicate the relation between some of the problems that concerned faculties and administrators during the down-swing of the business curve, and still concern them in the initial period of recovery.

Comparative Education.—The Advisory Committee on Comparative Education grew out of a conference of professors of education in colleges and universities which was held at the Office of Education in Washington, May 3 and 4, 1935. At the close of that meeting, an account of which is given in *School Life* for June, 1935, the members organized as an advisory committee on comparative education and selected I. L. Kandel of Columbia University as its chairman.

In order to have more definite information about the courses in (1) comparative education, (2) history of education, and (3) philosophy of education, as well as combinations of these now being given in institutions of higher education in the United States, the Office of Education, at the suggestion of the Committee, sent out a questionnaire in October, 1935. Replies came from approximately 468 persons and showed that 827 faculty members were conducting courses in one or more of the three subjects or combinations of them.

The largest number, 317, was in the field of history of education; philosophy of education was represented by 275; and comparative education by 96. Especially noteworthy is the fact that these subjects were *major* interests in 334 instances and strong secondary interests in 482 instances. All the replies to the questionnaire have not been tabulated, but enough has been done with them to indicate that the group of college and university staff members interested in these phases of education is fairly large and keenly alive to its opportunities and responsibilities. From the questionnaires, the Office of Education set up a mailing list of persons to whom all its publications relating to comparative education will be sent.

The Advisory Committee met on May 1 and 2, 1936, in a second conference held again in Washington. Not all of those who were at the first meeting could again be present. New members were John E. Bentley, American University; Newton Edwards, University of Chicago; Charles T. Loram, Yale University; Stuart G. Noble, Tulane University; and Robert Ulich, Harvard University. A somewhat detailed account of this meeting is to be had in Office of Education Circular, No. 159. An especially important paragraph relating to the value of the study of comparative education is as follows:

"The first value which may be derived from comparative education is that it contributes to broadening the professional point of view and to breaking down insularity and provincialism, and promotes by contrasting theories and practices, a better understanding and a sharper realization of the meaning of American education and practices. The second important contribution from this field is the methodological training which comes from the analysis of the factors and forces that enter into the determination of the character of a national system of education. Comparative education enables the student to see education as a social-cultural process in the broadest sense. Finally, because of the breadth of its approach, the subject provides a safeguard against too ready acceptance of everything that is offered as an innovation in education. Courses in comparative education should be offered as electives at both the undergraduate and graduate levels of education and should be intimately related to courses in the history and philosophy of education; reciprocal relations should be maintained between all these three fields. Beyond this, the contributions of comparative education should be used in other specialized courses."

At the time of this writing in October, 1936, the Committee has taken no action looking toward special activities for the academic year, 1936-37. Undoubtedly it will in some measure continue the work of bringing into closer relationships the many professional workers in the fields of comparative education, history of education, and the philosophy of education.

This statement was prepared by J. F. Abel of the U. S. Office of Education.

Orientation of Secondary Education.—The Committee on the Orientation of Secondary Education, with Thomas H. Briggs of Columbia University as Chairman, presented at St. Louis last February to the Department of Secondary School Principals its report on the "Issues of Secondary Education." This was published as Bulletin No. 59 by the Department.

The Committee will present in February, 1937, at the New Orleans meeting its second report, on the "Functions of Secondary Education." The ten functions were discussed at length and approved by the Committee in its sessions extending over three years and each one was as-

signed to an individual member for development. It is expected that consideration by the profession of the ten designated functions will give more definite direction to the work of secondary schools and that it will lead to the preparation of similar statements by representatives of elementary schools and of the liberal arts colleges. The Committee believes that such statements will lead to material improvement in the articulation of the traditional units of organization. The report on the Functions of Secondary Education will be published in January, 1937, by the Department as Bulletin No. 64.

Report on the Social Studies.—The report of the Commission on the Social Studies in the Schools which is still in the process of publication has continued to provoke animated discussion both among the general public and in educational circles.

The discussions of it before a Committee of the House of Representatives, as well as on the Floor of the House, and the review of the Report by Harold Laski were followed by syndicated articles which carried the discussions to all parts of the country. In educational circles the discussions have tended to become more discriminating and less emotional than was the case when the volume of *Conclusions and Recommendations* appeared.

With the recent appearance of the volumes by Beale[1] and Marshall and Goetz,[2] the publication of the report is nearing its close. Only two more volumes remain. The one by Bagley and others on the teacher is already in press, while that by Horn on method is, according to latest advices, ready to be sent to press. When these two volumes appear, the formal array of the material involved in the report will be available for general examination. The critics will then be in a better position to check their own judgments against those of the Commission to determine on what points they would agree with the majority and on what points differ.

The final array of sixteen volumes of the report is really needed to convey adequately something of the breadth and complexity of the problem by which the Commission was faced. It should also make clear something of the difficulties which the members of the Commission faced in arriving at a common conclusion. The many aspects of the problem, all of which have an essential bearing upon its solution, have tended to become matters of separate study and treatment. The public interest, school administrative policy, and technical educational research, as well as the more obvious matters of curriculum and method, are almost titles for separate fields of scholarship. The devotees of each have become so engrossed in the volume of their own research, literature, and discussion as to have little time to consider any of the others. Yet all are vital to the problem of the social studies in the schools. Thanks to the aid of the Carnegie Corporation, scholars of distinction in each of these fields were brought together to concentrate their attention upon this common problem during a period of five years.

It was no easy matter for the members of the Commission to discover that the problem was not peculiar to a single group, that in fact each group had very important contributions to make to any satisfactory solution of it. That stage in its development was followed by the no less difficult one of assimilating the contributions which the others had to make. In view of their own experience in the consideration of the problem, the mem-

[1] Beale, Howard K. *Are American Teachers Free?* Part XII: Report of the Commission on the Social Studies. New York: Scribners, 1936.

[2] Marshall, Leon C., and Goetz, Rachel Marshall. *Curriculum-Making in the Social Studies.* Part XIII: Report of the Commission on the Social Studies. New York: Scribners, 1936.

bers of the Commission can only be sympathetic with the wide range of opinions which their report has thus far aroused, not only in the public press, but even in educational discussion. Their own volume of *Conclusions* was intended as in the nature of editorial comment to summarize or balance the more individual judgments which the separate studies in the report represent. The full significance of that volume will be more fully appreciated when the reader has gone through the other volumes. It is to be expected, perhaps, that the readers will vary in their appreciation, as indeed in their reading, of all the volumes of the report. It is hoped, however, that all who undertake to criticize the report as a whole will have made the effort to examine it with some care. Such a procedure might lead to some interesting surprises. It might, for example, reveal to Mark Sullivan why members of the Commission, as conservative in their economic and political views as himself, and as truly concerned about the preservation of the national ideals, signed the final report. Perhaps he too, when confronted by the total scene of the nineteen thirties which they faced, will agree that the prescription required a very different formula from that which would have sufficed at the turn of the century.

This information was provided by A. C. Krey, University of Minnesota, Chairman of the Commission.

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